

MATERIALS TOWARD A MONOGRAPH OF THE GENUS VERBENA. XVII

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VERBENA LITORALIS H.B.K.

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Illustrations: H.B.K., Nov. Gen. & Sp. Pl. 2: pl. 137. 1818; Sanzin, Anal. Soc. Cient. Argent. Buenos Aires 88: 114. 1919; I. C. Verdoorn, Union of S. Afr. Dept. Agr. & Forest. Bull. 185: fig. 90 [as *V. officinalis*]. 1938; Augusto, Fl. Rio Grande do Sul fig. 102. 1946; Troncoso & Burkart, Darwiniana 7: 211, fig. 2b. 1946; O. Degener, Fl. Hawaii. 315: Verbena: Litoralis. 1960.

Quick-growing erect or suberect perennial herb, sometimes a suffrutescent shrub or undershrub, 0.2—2 m. tall, strict, shiny, sometimes large and robust, woody-based, fastigiately few- to many-branched above, glabrous or sparingly strigillose; stems to

12 mm. thick, tetragonal or subquadangular in cross-section, with the whole internode deeply sulcate above the insertion of the leaves and faintly many-sulcate between, antrorsely scabridulous (on the angles) when young, green, with white pith, slightly contracted at the nodes; leaves decussate-opposite, lanceolate to oblong or oblanceolate, 3-10 cm. long, 1-1.5 cm. wide, acute at the apex, tapering into a very short petiole or else sessile or subsessile, acuminate and somewhat clasping or subamplexicaul at the very base, antrorsely scabridulous throughout or scabrous and somewhat rugose only above, the upper 2/3 more or less sharply and coarsely serrate with commonly 3-5 somewhat mucronate teeth per side, sparsely strigillose on both surfaces, the venation impressed above and prominent beneath; spikes terminal, several to many, pedunculate, cymose or corymbose-paniculate, slender or filiform, pilosulous, at first congested and about 4 mm. in diameter, dense or interrupted, later loosely flowered and elongate, in fruit becoming 2-8 cm. long, the fruits usually not contiguous; bractlets ovate-lanceolate, marcescent, rigid, acuminate or subulate at the apex, 1-3 mm. long, usually subequaling or somewhat shorter than the calyx, abruptly upcurved, glabrate; calyx often purple, 2-2.5 mm. long, pubescent or finely strigillose outside, the rim subtruncate, the 5 teeth unequal, minute, and subulate; corolla about 3 mm. long, varying from dark-blue, blue, bluish, light-blue, pale-blue, lilac-blue, lavender-blue, bright lavender-blue, violet-blue, or pinkish-blue to bluish-lavender, blue-violet, blue-purple, blue-lilac, lilac, clear-lilac, violet-lilac, dull-lilac, violet, pale-violet, pale rose-violet, lilac-violet, lavender, light- or pale-lavender, pink-lavender, purplish, purple, bright-purple, deep-purple, mauve, pink, or red, often described as "lilac with a violet tube", "lavender with a red tube", "lavender with white center", or "throat pale-lavender or white, lobes lavender", puberulent on the outer surface, its tube greenish toward the base, variable in length, always somewhat longer than the calyx, the limb inconspicuous, usually pale-lavender, 2.5-3 mm. wide, puberulent on the inner surface, the lobes subequal, obtuse at the apex, glabrous; stamens 4; anthers greenish-yellow; style about 1 mm. long, green, glabrous; stigma 2-lobed, the larger lobe stigmatiferous; ovary almost 1 mm. long, green, glabrous; cocci trigonous, dark-stramineous, linear-oblong, 1 mm. to hardly 2 mm. long, glabrous and smoothish, striate, somewhat reticulate at the apex, the commissural face about as long as the coccus, muricate-scabrous; chromosome number:  $x = 7$ ,  $2n = 28$ .

An extremely widely distributed and polymorphic subtropical and tropical weed ranging from Arkansas, Louisiana, and Texas throughout Central and South America; introduced in Oregon, California, South Africa, Hawaii, Australia, and parts of Oceanica. It has been collected in open and waste places, grassy places and fields, along roadsides and fencerows, in grassy swales and wet meadows, thickets, wet thickets, and pastures, savannas and llanos, in cultivated and wet open ground, along moist roadsides, on roadside banks, at the edge of coffee plantations, in clearings

of temperate forests and "mata", on dunes and sand bars, in grassy pasturelands and ditches, in volcano craters, on moist riverbanks and stream edges, in wet campos and lawns, in marshes and barren ground along streams, in rocky calcareous fields at the margins of woods, in dry sandy soil on sunny roadsides, in open ground on lake margins, among bushes, on hillsides, in cafetals, potreros, and vacant lots, on "reddish clayish-loam in luxuriant tropical forests" and "on rich clayish-loam along lake shores", at the edges of cemetaries, along city streets, in dry barren scrubland and sunny sand, at the edge of thickets, on rocky limestone slopes, in Panicum maximum fields, on creek banks and bottoms, along grassy roadsides, in low and sandy areas, low marshy areas, on grassy hillsides, in springy areas and water-filled depressions, at the borders of cultivated fields, in valley land, on low ridges, and among low grasses in open spots, from sea-level to 3550 meters altitude, flowering and fruiting in every month of the year.

Reiche (1910) says "Planta americana, desde Méjico a las rejas templadas de Sud-América; en Chile tanto en la zona litoral como en el interior; tambien en J. F. (Masatierra). Florece casi todo el año.

The species was found in Amador County, California, in 1896, and in San Joaquin County in 1902. King describes it as an uncommon roadside weed, growing in open sun, in San Luis Potosí, Mexico.

The type of the species was originally described by Bonpland as "crescit in salsis maritimis Oceanis Pacifici prope Truxillo, Santa et Lima", Peru; that of V. affinis was collected by Henri Guillaume Galeotti (no. 781) at an altitude of 6000 feet at Morelia, Michoacán, Mexico; that of V. arborea is Herb. Hort. Bot. Bogor. XV.K.A.XLV.17, cultivated at Buitenzorg, Java; that of V. litoralis var. pycnostachys f. montana was collected by Cornelius Osten (no. 10615) at Villa Nougues, at an altitude of 1100 meters, Tucumán, Argentina, on May 17, 1917, and is deposited in the herbarium of the Museo de Historia Natural at Montevideo; and that of V. lanceolata is Herb. Willdenow lll34, deposited in the Willdenow Herbarium at the Botanisches Museum in Berlin.

As to V. nudiflora, Degener (1960) says "Thomas Nuttall collected this plant on 'Wahoo' [-Oahu] in 1835. Thinking it new, he proposed to name it Verbena nudiflora, writing this name upon his herbarium sheet. Nuttall died in 1859 and Nicolaus Turczaninow, a year before his own death, took up Nuttall's binomial from the herbarium label and published it for him. Thanks to the kindness of Bayard Long of the Academy of Natural Sciences in Philadelphia who compared Nuttall's historic specimen deposited at the Academy with a specimen of Verbena litoralis mailed him from Waialua, Oahu, in 1960, we know we must relegate Nuttall's name to synonymy."

The V. litoralis var. pycnostachya Schau. sometimes included in the synonymy of V. litoralis is regarded by me as V. brasili-

iensis Vell., while V. caracasana H.B.K. and V. litoralis var. caracasana Briq., also sometimes placed here, are discussed by me under V. litoralis var. caracasana (H.B.K.) Briq., which see. V. mudiflora L. belongs in the synonymy of Phyla nodiflora (L.) Greene, V. parviflora Ruiz is V. gracilis Desf., V. arborea H.B.K. is Petrea arborea H.B.K., and Lippia litoralis R. A. Phil. is Phyla nodiflora var. rosea (D. Don) Moldenke.

Bentham's original description (1846) of his var.? glabrior is as follows: "Verbena litoralis var? glabrior, folia hinc inde trifidis grosse et obtusiusculae inciso-dentatis. An species propria? Folia V. menthaefoliae, Benth. Pl. Hartw. p. 21, sed flores parvi V. litoralis. — Peita."

One known hybrid of V. litoralis is with V. hispida Ruiz & Pav. and is discussed by me under xV. bealei Moldenke. Undoubtedly many other hybrids occur in the wild, accounting for some of the anomalous intermediate specimens bandied about between this and related species by herbarium workers, but more experimental work is needed before these can be clearly isolated.

In his discussion of V. bonariensis L., Hooker [Bot. Misc. 1: 166. 1829] says "V. litoralis Humb. seems to be a variety of this with shorter spikes than usual." On the basis of this statement, Gay and other authors speak of a "V. bonariensis var. litoralis Hook."

Pellett (1923) reports that honey is yielded by V. litoralis "over an area of considerable extent from Baton Rouge to near New Orleans in Louisiana."

Degener 17852 has leaves which greatly resemble those of V. brasiliensis; Cuatrecasas 18654 has unusually large dark-green leaves. Peredo s.n. [29-I-1946, Cabezas, Cordillera] bears this description on its label: "20—40 cm. tall; petals pale-yellow and stamens purple", but this is probably erroneous.

Troncoso & Burkart (1946) say: "La difundida V. litoralis se diferencia por las espigas delgadas, de 3—4 mm. de diámetro..... flores de 4—5 mm. de long., cáliz de 2,3—2,8 mm. de long., cubierto de pelitos breves uniformemente repartidos sobre su superficie, brácteas también menores [than in V. tristachya Troncoso & Burkart], do 2—3 mm. de long. y pubescentes....En V. litoralis las ramas superiores y los tallos jóvenes son macizos, observándose que los tallos más gruesos y los entrenudos inferiores son algo fistulosos, pero con una gruesa capa de médula.... El estudio anatómico del tallo de V. tristachya presenta como característica interesante, que la capa de parénquima clorofílico es continua, es decir, que no se halla interrumpida en los ángulos por la columna esclerenquimática. Esta última estructura caracteriza a V. litoralis."

Herbarium material of V. litoralis has been misidentified abundantly and distributed under such names as V. angustifolia

Michx., V. bonariensis L., V. brasiliensis Vell., V. caracasana Humb. & Bonpl., V. caracasana H.B.K., "V. caracasana var.", "V. cf. caracasana HBK.", V. caracassana H.B.K., V. gracilescens (Cham.) Herter, V. halei Small, V. hastata L., V. hispida Ruiz & Pav., V. isabellei Briq., "V. litoralis" Kth. vel aff., V. litoralis f. pycnostachya Schau., V. litoralis var. brasiliensis Briq., V. litoralis var. pycnostachya Schau., V. officinalis L., V. officinalis var. gracilescens Cham., V. paniculata Lam., V. poly-stachya H.B.K., V. stricta Vent., V. urticaefolia L., V. urticifolia L., V. xutha Lehmann, Lippia sp., Priva leptostachya A. L. Juss., Stachytarpheta dichotoma Pers., and even Cyathula achyranthoides (H.B.K.) Moq., Buddleia asiatica Lour., Hyptis pectinata Poit., and "an Spartium?"

Perry annotated Maltby 252 and P. B. Kennedy 7046 [whose label originally read "6046"] as "Aff. V. menthaefolia Bth." Herter s.n. [Herb. Osten 18497] was annotated by Osten as "Verbena litoralis Kth. ad V. bonariensem L. spectans", while Lindman A.3647 was annotated by Briquet as "Verbena litoralis Kunth v. brasiliensis Briq. f. aliq. ad var. caracasana vergens."

On the other hand, the Henschen I.326 and Regnell I.326, distributed as V. litoralis, are actually V. alata Sweet; Bruch s.n. [Las Juntas, XII/1896], Gunckel 16865, Harshberger s.n. [Pembroke's Swamp, June 21, 1905], Holway & Holway 1180 & 1454, and Venturi 2812 are V. bonariensis L.; M. Bang 136, Claude-Joseph 2616, Cook & Gilbert 271 & 1208, Dusén 8, Holway & Holway 1272, Killip & Smith 17340, Morong 128, Rose, Pachano, & Rose 22845 & 22846, and Sehnem 4470 are V. brasiliensis Vell.; Heyde & Lux 3019, Liebmann 11339, and Renson 175 are V. carolina L.; A. Stewart 3319 is V. galapagosensis Moldenke; Anthony & Tate 333, Killip & Smith 21197, Pittier 11428, A. Stewart 3317, and ll. Williams 5911 are V. glabrata H.B.K.; M. Bang 1058 is V. gracilescens (Cham.) Herter; Jørgensen 1021 is V. hispida Ruiz & Pav.; Liebmann 11318, C. R. Orcutt 1371, Purpus 3406, and Saler & Seiler 724 are V. longifolia Mart. & Gal.; Bourgeau 360 is V. menthaefolia Benth., as is also Arsène s.n. [Rincón, 25/7/1909]; Dusén 8546 is V. minutiflora Briq.; R. Alvarez 427, Arechavaletae 39 & 3139, Beetle 2025, Cabrera 861, 1710, 2108, 2159, & 2386, Collector undesignated s.n. [Dec. 1885], H. M. Curran s.n. [Oct. 19, 1913], Dusén 7827, Grüner 418, Herter 269 [Herb. Herter 81713], Kuntze s.n. [Montevideo, 7/XII/91], Legrand 254 & 2009, Nicora 377, Osten 3165 & 3335, Pastore 137, Pedersen 774, Rambo 45339, 46069, 49723, & 55075, Reiss 55 & 56, T. Rojas 448, Rosario 313, 399, & 400, Scala 10001, Sehnem 3519, Seijo s.n. [16 Nov. de 1884], Smith & Klein 11797, Smith & Reitz 8988 & 9730,

Smith, Reitz, & Sufridini 9624, and Teisseire 4481 are all V. montevidensis Spreng.; A. H. Moore 2939a, Herb. Harvey s.n. [ex seminib. h. R. P. 1841], Herb. Hort. Matrit. 31, and Yuncker 10145 are V. officinalis L.; C. R. Orcutt 118, 521, & s.n. [Pinery, 7-27-1883] are V. orcuttiana Perry; Fiebrig 5645 is V. ovata Cham.; Kuntze s.n. [Bolivien, 600 m., 1/4 April 1892] is V. parvula Hayek; Venturi 5 is V. rigida Spreng.; Jørgensen 3773 is V. stellariooides Cham.; H. L. Mason 1612 and Patrino 7138 are V. sphaerocarpa Perry; A. Stewart 3320 is the type collection of V. stewartii Moldenke; Cory 45878 is V. xutha Lehmann; and Heriberto 388 is not verbenaceous. The A. A. Heller 15162, distributed as V. hansenii, is actually V. bonariensis L.

H. E. Seaton 27 and Sharp 441120 are insect-galled; Liebmamn 11336 is also abnormal. Its spike is thickened like that of Stachytarpheta cayennensis (L. C. Rich.) Vahl and there are no developed flowers, only large bractlets -- it may possibly represent an intergeneric hybrid between the two taxa. Lutz 1185 is a mixture with V. brasiliensis Vell., Schlutes & Reko 237 is a mixture with V. carolina L., and Hanbury-Tracy 256 is a mixture with something non-verbenaceous. The "V. officinalis" described and illustrated by I. C. Verdoorn, Union of S. Afr. Dept. Agr. & Forest. Bull. 185: 171, fig. 90 (1938) is actually V. litoralis.

The Hummel s.n. cited below from Caracas, Venezuela, is an especially dense-flowered plant and may actually represent var. caracasana; the same is true of Demaree 24649 from Arkansas. In fact, many specimens cited below by me as V. litoralis seem anomalous in that their spikes are much more dense than in what I regard as typical V. litoralis as exemplified by A. A. Heller 2046, P. Russell 52, C. N. Forbes 188.2, and Ll. Williams 452. Meagher s.n. [July 7, 1937] is in part typical and in part dense. The dense form is well represented by J. M. Wood 13132, A. Forbes 1083m & s.n. [Tantalus Rd., 7/18/30], F. E. Egler 37-83, D. W. Garber 339, F. R. Fosberg 8856 & 10276, and K. Hartley s.n. [Wainae, May 4, 1856]. Quayle 258 is rather dense but weak, while C. N. Forbes 2036m is very dense. C. S. Judd 11 and C. N. Forbes 465h look very much like V. brasiliensis Vell. Personal observation of the plant growing so abundantly in the Hawaiian Islands causes me to have misgivings about its correct determination. It does not appear to be the same as the common weed which I observed in so many places in South America. I would not be at all surprised if further study should reveal that this dense-spiked form belongs in var. caracasana. The Jørgensen 3767 [Herb. Osten 22248] (Ug), cited by me on page 322 of Phytologia, vol. 8, as V. brasiliensis, seems, rather, to be V. litoralis. It is very possible that much of the material cited as V. litoralis from south-

ern Brazil and northern Argentina is V. montevidensis.

Augusto (1946) says: "Comun no sul do Brasil (Sello). Muito comun nos campos e morros dos arredores do Pôrto Alegre. (Emrich, Irmão Augusto e Irmão Edésio.)" Rosengurtt (1946) says "Mala hierba perenne (a sufruticulosa?), de ciclo estival. Abunda en campos vírgenes y de rastrojo". He cites his PE.506, 563, 590, 696, 739, 859, and 1213.

Hallier D.589 was first identified as V. urticifolia L., then as V. officinalis L., then as V. angustifolia Michx., and finally as V. litoralis by various herbarium workers! The species is said to have been introduced into cultivation in 1875.

On Indefatigable Island it is described by R. G. Taylor as occurring "in a partially deserted clearing in the forest in moist zone of island" and being an "herb, 2--3 ft. high, fls. lilac, possibly an imported plant, not seen in untouched forest."

Schulz & Schulz found it "eingeschleppt" in Berlin, Germany, in 1898. On Easter Island it was found by Chapin on the inside of a volcano crater, as also on Maui in the Hawaiian Islands. Fosberg found it to be a weed in yards in Cundinamarca, Colombia, while Mendes Magalhaes describes it as "ruderal" in Minas Gerais, Brazil. Morel says that it is a "common plant on campo" at Riacho Porteño, Formosa, Argentina, while Jürgensen describes it as abundant at Andalgalá. Goodspeed asserts that it is "common and perhaps introduced.....in rather moist soil in irrigated fields" at Valparaiso, Chile. Stellfeld and Roth both describe it as "ruderal", Smyth says that it is the "common tall verbena of the valley, common in waste places", Tamayo avers that in his country the plant is "very common in abandoned cultivated fields", while Yuncker, Dawson, & Youse refer to it as "a weedy plant". Lutz encountered it "abundant by roadside", Steinbach in "tierra greda", and Sandeman as "frequent in full exposure". Herter describes it as "along Roadsides in dry sandy soil exposed to full sun" and "common in dry sandy soil along roadsides" at Montevideo. Jürgensen reports it "common on campo" in Paraguay, while Rimbach calls it a "weed in gardens and on walls" in Ecuador.

On Masatierra the Skottsbergs found V. litoralis in colonies along roads and frequent on the shore; Mandon claims that it is "everywhere in cultivated land, hedges, and thickets near Sora-ta" in La Paz, Bolivia; Macbride & Featherstone describe it as a "common pasture and wayside weed" in Junín, Peru; and Lindman found it "abundant in pastures" in Rio Grande do Sul, Brazil. Sampaio comments "nos terranos incultos, à beira de lugares hú-midos". Hanbury-Tracy discovered it growing in grass meadows in foothills and fairly dry ground among spaced scrub with few trees. Steward affirms that in the Galapagos Islands it is abundant in open country around 9000 feet altitude, common in wet soil near springs at 1000 feet, and rare at 1550 feet. DeWolf found it to be "fairly common" along trails in Costa Rica. Ewan describes it as a "rather common perennial" with the "appearance of Statice in the field". Stanford, Retherford, & Northcraft

found it "in broad damp river-bed with varied vegetation of large shrubs, small trees, and herbs" and "on mountains with luxuriant vegetation". Standley (1938) says of it "frequent in waste places, often in cultivated fields, tierra caliente, ascending to the Meseta Central, mostly as 1,300 meters or less, but sometimes at somewhat higher elevations. Widely distributed in tropical America" and "weed in waste ground, dry brushy hillsides, and dry thickets". Northcraft says that they are "aquatic plants growing in canal next to road". In Honduras, according to Molina R., the species is a "weed in pine forests". Cook & Gilbert 2088 was "purchased in market" in Peru.

Degener (1960) records our plant from Maui and Hawaii and "on all the larger islands" of the Hawaiian group "from sea level to almost the tops of our highest mountains, preferably in pastures, pineapple fields, waste places and lava flows; never in dark forests. On Maui and Hawaii the Hawaiians have used it as a medicine for skin diseases." He also says "Mann in 1867 correctly judged this weed introduced, while Hillebrand in 1888 described it as 'a troublesome weed of early introduction which has taken root in many parts of the Islands, most so on the highlands of Waimea, Hawaii, where large extents of pasture land have been ruined by it.' Miss Neal (1949) refers to it as a "weed at 3000 feet". A note on Herb. Oahu Coll. 56, however, says "once a troublesome weed, now nearly run out". In New South Wales, according to Kaspiew, it constitutes a "pest in pastures".

Common and vernacular names recorded for this plant in various parts of its range are "berbena", "erva de São Caetano", "erva do pai caetano", "escoba dura", "false vervain", "hauoi", "ha' uoi", "herba do Pae-Caetano", "oi", "'oi", "quininha", "seashore vervain", "titania", "verbena", "verbena amarge", "verbena del campo", "verbena del litoral", "verbena blanca", "verbena erguida", "verbena blanca serrana", "verbena cimarrona", "verbena negra", "verbena nigra", "verbena on parade" [meaning, the upright verbena], "verbena parada", "vervena", "weed verbe-na", "yerba de acero", "yerba del acero", "yerba de padre Caetano", and "yerbón".

Philippi (1870) comments concerning var. leptostachya "La traza es diferente de la forma comun por ser los frutitos mucho mas pequeños; pero los ejemplares, demasiado adelantados en la vegetacion, no dejan ver otras diferencias". Rosengurtt (1943) says "Hierba hemicriptófita a sufruticosa; florece de fines de primavera hasta principios de otoño. Habita en lugares muy variables de los campos, bosques, poblaciones, chacras, etc. Es común, y el ganado la mantiene recortada normalmente". He cites his PE.1269, 1335, 1447, 1576, 1783, 1908, 2059, A.1002, and OH. 18489 from Uruguay. Cabrera & Dawson (1944) describe the plant as "Hemicriptófita parecida a las anteriores, pero de sólo 40 a 90 cm de altura y con espigas más delgadas. Vegeta en casi toda América del Sur" and cite Dawson 946 and Cabrera 1710. Calderón & Standley (1941) report it as common in El Salvador.

Stellfeld (1951) states "Chamada na ciudad e do Rio Negro (Par-

aná) de 'quininha' e 'erva de São Caetano' em outros lugares e em São Paulo, reputada como febrifuga, daí o seu nome. E' bastante amarga". Reitz also reports the species as used medicinally in Brazil; the Hinckleys say that it is used as a purgative in Arequipá, while Archer reports it to be a "general remedy, also used for cough" in Paraguay. In Guatemala, according to Ruano, it is employed as a remedy for fevers, gripe, and smallpox. Garcia & Barriga report it as medicinal in Colombia; Duque avers that it is cultivated there for its "bitter and medicinal properties" and Niemeyer also reports that it is used against fevers. Standley (1938) makes this comment: "The plant is employed in domestic medicine as a remedy for fevers" in Costa Rica. In Colombia it is said by Fosberg to be employed as an antimalarial and as a remedy for typhoid fever, while on the Hawaiian islands of Hawaii and Maui he reports the juice commonly used for skin ailments. Fernandez refers to it as a "shrub" and maintains that it reduces fever very quickly -- the leaves macerated and boiled are taken internally as a vermifuge against hookworm. Assis also refers to the plant as a "shrub". Hegi (1927) says "gegen Scrofulose verwendet". Hinton states that the "very bitter juice from macerated plant [is] taken for malaria" in Mexico. Steinbach reports that in Bolivia the plant is "medicinal, used against contusions".

Martens & Galeotti (1844) describe their V. affinis as differing from V. bonariensis L. in "foliis brevioribus, spicis filiformibus elongatis laxis vix pilosis breve pedunculatis cauleque non hispido", which is a fairly accurate statement of the differences between V. litoralis and V. bonariensis. Schauer (1847) separates his two varieties as follows: " $\alpha$  pycnostachya - spicis virgineis densioribus subcylindricis;  $\beta$  leptostachya - spicis jam virgineis magis filiformibus, dein capsularis saepius valde elongadis". The former is apparently merely a new status and name for V. brasiliensis Vell. and must be reduced to the synonymy of that taxon. To the second of his varieties Schauer reduces V. caracasana Kunth, V. lanceolata Willd., and V. affinis Mart. & Gal. (which he says is a "forma umbrosa, plerumque magis glabrata, spicis pube appressa subcanescens"). He cites a Philippi collection from Chile; Schiede 135 & 1168 from Jalapa and Papantlam, Mexico, and C. Ehrenberg and Galeotti collections from "Tlocalulo alibique", Mexico; Humboldt & Bonpland s.n., Vargas and Moritz collections from Venezuela; Leschen s.n. from Guiana; and Sellow s.n. from Brazil, all deposited in the Berlin, Martius (Munich), and DeCandolle (Geneva) herbaria. In his 1851 publication he modifies the description of his variety leptostachya to "spicis jam virgineis magis filiformibus, dein saepius valde elongatis et relaxatis". He described V. bonariensis  $\beta$  litoralis as "forma campestris aprica, plerumque undique magis hispidula". He adds V. glabrata H.B.K. to the synonymy of his var. pycnostachya with the comment "Hujus

nil nisi modificatio monticola, magis compacta, glabrior est". He cites Harrison, Gardner, Lhotsky, Sellow, Ackermann, Guillemin, and Lund collections, as well as Martius 1033 and Vauthier 192, all from Rio de Janeiro, and Riedel s.n., Raben s.n., and Regnelli 326 from Minas Gerais. He says: "forma  $\alpha$  [V. brasiliensis] etiam provenit in Bonaria, Chile, Peruvia, Colombia, Venezuela" and "forma  $\beta$  [V. litoralis] in Mexico, Venezuela, Guiana."

Briquet (1904) claims that "V. litoralis Kunth....sensu stricto" is the same as V. brasiliensis Vell. and V. litoralis var. brasiliensis Briq. Of his own V. approximata (which I regard as conspecific with V. brasiliensis) he says: "Cette espèce est très voisine du V. litoralis et n'est pas facile à en distinguer quand les feuilles inférieures manquent. Le V. litoralis possède des feuilles inférieures moins oblongues, grossièrement et irrégulièrement incisées-dentées, tandis qu'elles sont régulièrement et finement crénelées-dentées dans le V. approximata. En outre, ce dernier a des tiges à angles plus aigus, presque subaillantes grâce au sillonnement des faces, et des feuilles inférieures plus allongées étroitement linéaires, plus raides. L'inflorescence et les caractères floraux sont tout à fait ceux du V. litoralis var. brasiliensis". In his 1907 publication he compares it with V. carollata Briq. as follows: "Nous avions rapporté cette espèce en 1899.....au V. litoralis Kunth, concu à cette époque dans un sens très vaste. Une étude plus attentive de ce groupe, fait depuis lors, nous a amene à détacher du V. litoralis plusieurs types parfaitement distincts (V. Isabellaei, V. cordobensis). Le V. carollata s'écarte à son tour du V. litoralis principalement par sa corolle à tube si-phoné longuement exsert (dépassant à peine les dents calicinaires dans le V. litoralis), son calice oblong, plus grand, ses épis presque du double plus gros, etc."

It should be noted here that the Loud., Hort. Brit. Suppl. (1839) reference given in the bibliography above is sometimes erroneously credited to W. Baxter.

Raimondi (1943) says "Flores azules, ligeramente moradas", "morado azulino", or "morado claro", and cites his nos. 3948, 4414, 6533, 6727, and 6976 from Cajamarca, 9568, 9584, and 11139 from Puno, and 11418 from province undetermined, Peru. Hayek (1908) cites two Wacket collections and a Wettstein & Schiffner collection from São Paulo, Brazil. Herrera (1941) cites his nos. 1505, 1664, and 3362 from Cuzco, Peru, and gives the range of the species as "El Salvador, Chile, Uruguay, and Argentina." Thorne (1954) cites it from Decatur and Glynn Counties, Georgia, but describes it as "rare" there. Chodat (1902) cites Hassler 4887 from Paraguay, which, however, I regard as V. brasiliensis Vell. Johnston (1931) cites Anthony 380, Berkeley 231, and Mason 1612 from Socorro Island, but these

are actually all V. sphaerocarpa Perry.

Rambo, in a letter to me dated August 14, 1955, is of the opinion that his no. 38055, which I identified as V. montevidensis Spreng., is actually V. litoralis because, he says, it was growing along a roadside (typical of V. litoralis) and not in a swamp (typical of V. montevidensis). The Dugand & Jaramillo 3030 collection cited below may have come from either Chocó or Valle del Cauca, Colombia. The name of the Venezuelan collector, Nicolas Funck, is misspelled "Funcke" in the Vienna herbarium. The original publication of Humboldt, Bonpland, and Kunth for this species is very often cited as "1817", but appears to be more correctly dated 1818.

Glaziou (1911) cites his no. 14162 from Rio de Janeiro, but I regard this as V. brasiliensis. Perry (1933) cites the following 37 additional specimens not as yet seen by me: CALIFORNIA: Amador Co.: G. Hansen 2025 (E). MEXICO: Jalisco: Pringle 11093 (E, F, G). Michoacán: Arsène s.n. [Coronilla, 8 Aug. 1909] (W); Galeotti 781 (K); Gregg 764 (E). Nayarit: Edw. Palmer 201ha (G, N). Oaxaca: Pringle 4877 (D, E, G); C. L. Smith 222 (E), 794 (G). San Luis Potosí: Edw. Palmer 141, in part (G); Schaffner 718 (G). Tabasco: J. N. Rovirosa s.n. [Mayito, 10 April 1889] (D, N, W). Vera Cruz: Mohr s.n. [Huatusco, April 1857] (W); Seaton 27 (F, G). GUATEMALA: Alta Verapaz: Türckheim 904 (D, F). HONDURAS: Comayagua: P. C. Standley 56082 (F). EL SALVADOR: La Libertad: P. C. Standley 23326 (G). San Salvador: Calderón 729 (G), 925 (G); Renson 291 (W); P. C. Standley 20617 (G); Velasco 8848 (G). San Vicente: P. C. Standley 21486 (G). COSTA RICA: Cartago: Cooper 5890 (E, F, G). Province undetermined: Worthen s.n. [April 1910] (E). She says "This is a widely distributed species with very distinctive habit and somewhat variable inflorescence. In some specimens the spikes appear to remain compact, in others they tend to elongate. Schauer used this difference to separate the forms pycnostachya and leptostachya, although he frankly admits the difficulty of distinguishing the two owing to the intermediate phases. V. affinis is characterized by a somewhat coarser floral pubescence; this, however, seems to be a variable feature, and, as such, does not appear to merit more than passing mention." Her key for distinguishing five related species is worth repeating here:

1. Leaves semiamplexicaul and subcordate.
2. Inflorescence glandular; bractlets conspicuously longer than the calyx; corolla-tube 2-3 times as long as the calyx.....V. rigida.
- 2a. Inflorescence not glandular; bractlets barely equaling or only slightly exceeding the calyx; corolla-tube scarcely twice as long as the calyx.....V. bonariensis.
- la. Leaves not semiamplexicaul nor subcordate, tapering into a

- cuneate-attenuate subsessile or petiolar base.
3. Spikes 3—5 mm. long, very dense and appressed-pubescent.
4. Fruiting-calyx ascending; schizocarp longer than broad, raised-reticulate above, striate toward the base.....
- V. brasiliensis.
- 4a. Fruiting-calyx spreading; schizocarp as broad as long, practically smooth.....
- V. sphaerocarpa.
- 3a. Spikes 5—10 mm. long, dense at the apex, somewhat open below and finely strigillose.....
- V. litoralis.

It should be noted here that her use of "mm." in the above key seems to be an error for "cm." — errors easily made in the metric system of measurement and causing much confusion.

Acevedo de Vargas (1951) cites the following: CHILE: Santiago: Collector undesignated s.n. [XII.1877] (Sg—42460), s.n. (Sg—54706); C. Gay 1084 bis (Sg—54703). Curicó: Collector undesignated s.n. [Llico, XII.1861] (Sg—54705), s.n. [Vichuquén, XII.1861] (Sg—42464). Coquimbo: Albert s.n. [I.1897] (Sg—68333); Vitor s.n. [XII.1897] (Sg—68334). Valparaíso: Buchtien 4 (Sg—68335). Juan Fernandez: Collector undesignated s.n. [XI.1864] (Sg—42485, Sg—54700); Edwyn Reed s.n. [X.1872] (Sg—42474, Sg—54701).

In all, 998 herbarium specimens, including type material of many of the names involved, and 6 mounted photographs have been examined by me.

Citations: ARKANSAS: Ashley Co.: Demaree 16511 (N), 17624 (Ok), 23893 (Sm), 24403 (Sm); E. J. Palmer 44270 (N). Bradley Co.: Demaree 19543 (N, Sm). Chicot Co.: Demaree 25674 (Sm). Drew Co.: Demaree 24649 (Gg), 34649 (Bm, Sm). LOUISIANA: Terrebonne Par.: Wurzlow s.n. [Houma, May 5, 1914] (N), s.n. [Houma, May 9, 1914] (N, N). TEXAS: Newton Co.: Tharp s.n. [7-23-39] (Au). OREGON: Multnomah Co.: Suksdorf 2912 (Pl—138415), 2913 (Pl—138414). CALIFORNIA: Amador Co.: G. Hansen 2025 (Du—24183, W—338509). Bouldin Island [San Joaquin Co.]: Congdon s.n. [Sept. 2, 1902] (Gg—31376, W—466670). MEXICO: Chiapas: Matuda 438 (Mh, Mi, W—1689444), 836 (N), 5193 (Ld), 5302 (Ld), S.56 (Mi). Chihuahua: Le Sueur 871 (Au). Hidalgo: G. L. Fisher 46170 (W—1889830); Rose, Painter, & Rose 9077 (W—452556), 9151 (W—452634); A. J. Sharp 441828 (N). Jalisco: McVaugh 16949 (Mi), 17204 (Mi); Pringle 11093 (Cm, Me, Me, N, Ut, W—460475). México: Hinton 1575 (N), 3731 (N, N, W—1844681), 12156 (La), 12241 (La); M. E. Jones 736 (Po—70661); Kenoyer s.n. [Teotihuacan, 7-30-38] (Fs); Matuda 27651 (Z), 27884 (Cb). Michoacán: Arsène 1034 (Br), 3000 (W—464298), s.n. [Rincón, 15/7/1909] (Br, Br), s.n. [Quinciao, 11/11/1909] (W—464297); Barkley, Paxson, & Webster 2677 (Au—123277, N); Galeotti 781 (Br, F—photo, N—photo, Si—photo, Z—photo); Hinton 12156 (Au, N, Rf, W—1321761), 12241 (Mi, N,

Ur, W--1821762), 12520 (Au, Mi, N, N, Rf, S, W--1890991), 12869 (Ca--741491, N, W--1977302); Northcraft III (La, N). Morelos: N. L. H. Krauss 70 (Ng--6575); E. Lyonnet 656 (W--1642948); Moldenke & Moldenke 19826 (Es, Lg, N); W. Trelease 224 (Ur). Nayarit: Edw. Palmer 2014 (N), 2019 (Cp, W--305272). Oaxaca: W. H. Camp 2433 (N); Pringle 4877 (Br, C, Ca--104841, Cm, Io--38756, Me, Me, Me, Mm--15390, N, Po--63890, S, Vt, W--251682); Schultes & Reko 237, in part (Oa--8209), 437 (Me); C. L. Smith 222 (Ca--975387, N, W--312570). Puebla: Arsène s.n. [near Puebla, 20/10/1908] (Br, W--464301); Chute M.142 (Mi); Fröderström & Hultén 1051 (S); Nicolas s.n. [Rancho Posadas, 2/4/1909] (Br, Br, Br); F. Salazar s.n. [Pahuatlán, 14 June 1913] (Me, W--1013227); A. J. Sharp 441120 (N). San Luis Potosí: L. I. Davis 239 (N); R. M. King 4432 (Au--189783, N); C. L. Lundell 12165 (Ld); Urbina s.n. [Junio de 1892] (Me). Sonora: P. B. Kennedy 7046 (Ca--373581, W--1287217). Tabasco: J. N. Rovirosa 448 (C, Pa, W--1323106). Tamaulipas: Kerber 311 (Br); Rozynski 550 (Du--226681); Stanford, Rutherford, & Northcroft 913 (Du--288697, N, Tu--15152), 1024 (Du--286261, N, Tu--16243). Vera Cruz: Barkley, Rowell, & Webster 2536 (Au--123273, N); L. I. Davis 225 (N), 234 (N); Dressler & Jones 177 (Bm, Ca--48867, N, W--2328426); G. L. Fisher 168 (W--1315998), s.n. [Aug. 13, 1926] (Du--154566, Mg--42); Galeotti 773 (Br); F. W. Johnson s.n. [Cordoba, 9-26-06] (N); Kerber 311 (W--323103); Matuda 836 (Mh, Mi); C. T. Mohr 317 (W--771869); J. V. Santos 2461 (Mi); H. E. Seaton 27 (C, W--56168). State undetermined: Galeotti 783 [Meratitlan] (Br); Haenke 1575 (N); Hinton 1575 (N); Liebmann 11336 [Tepiscapa] (W--1315097). GUATEMALA: Alta Verapaz: Cook & Griggs 148 (W--407936); Türckheim 904 (C, G, Pa, W--56170, W--1323108). Amatitlan: Tonduz 487 (W--1080089). El Petén: Contreras 2635 (Ld), 3088 (Ld); C. L. Lundell 16386 (Ld). Guatemala: Bernoulli 128 (Br, C); J. F. Brenckle 47-257 (Gg--353583, N), 47-258 (N, S), 47-259 (N); C. C. Deam 6180 (G, Mi, Vt, W--579572); Degener & Degener 26476 (N, W); Moldenke & Moldenke 19818 (Lg, N); Ruano 332 (W--1168396), 403 (W--1168427); Tejada Aguirre 4 (W--691762); Tonduz 627 (W--1084723); E. Wall s.n. [Guatemala City, 20/4/28] (EW). Izabal: P. C. Standley 24404 (W--1150046). Jutiapa: P. C. Standley 76018 (N). Quezaltenango: P. C. Standley 83196 (N). San Marcos: G. Salas 32 (W--1206750). Santa Rosa: Heyde & Lux 3019, in part (G), 4370 (C, G, W--200177, W--1323101). Totonicapán: P. C. Standley 84061 (N). Department undetermined: Heyde & Lux 610 (W--247494). BRITISH HONDURAS: Gentle 6481 (Ld), 7119 (Ld). HONDURAS: Comayagua: P. C. Standley 56082 (W--1409090); Yuncker, Dawson, & Youse 5624 (Dp, Mi, S, St). Morazán: S. F. Glassman 1606 (Ok), 1864 (N), 2011 (N, Ok, Ur); Molina R.

380 (Ca--792622), 960 (W--1975680); Williams & Molina R. 10159 (Mi). EL SALVADOR: Chalatenango: Tucker 990 (Ca--1000906, W--2088237). La Libertad: P. C. Standley 23326 (W--1139015). San Salvador: Calderón 729 (N, W--1151687), 925 (W--1151890); M. C. Carlson 407 (Ca--703555); Renson 291 (N, W--399584); P. C. Standley 20617 (W--1136452), 22842 (W--1138569); L. V. Velasco 8848 (W--829120, W--1323098). Santa Ana: Tucker 1308 (Ca--1000907, Rf, W--2088429). San Vicente: P. C. Standley 21486 (N, W--1137291). NICARAGUA: Managua: Garnier 301 (I), 642 (Mi); Maxon, Harvey, & Valentina 7356 (N, W--1181068), 7478 (W--1181185). COSTA RICA: Alajuela: Boscilla s.n. [San Ramon, 1935] (N); Brenes 11522 (N), 14648 (N); Chrysler 4966 (N, Ru). Cartago: J. J. Cooper 5890 (C, W--1323107); De Wolf 425 (Tl); Moldenke & Moldenke 19807 (N); Ørsted 11324 (W--1269919); Tonduz 4220 (Br), 4221 (Br); Torres Rojas 97 (Du--255758). Guanacaste: Standley & Valerio 45430 (W--1254108). Heredia: Brenes s.n. [Vol. Irazu, 1912] (N). Puntarenas: Maxon & Harvey 7951 (W--1181615); H. Pittier 3488 (Br); Stork & Morrison 8919 (Ca--648929, W--2216483). San José: Biolley 1085 (Br); H. Pittier 227 (Br), 691x (Br); Skutch 2749 (Mi, N, S, W--1642645); P. C. Standley 32652 (W--1225858), 33293 (W--1226214); Tonduz 7978 (Br). Department undetermined: Kuntze 2109 (N, W--700762); Ørsted 11322 [Mt. Aguacote] (W--1269918); H. Pittier 2389 [Agua caliente] (Br). PANAMA: Chiriquí: P. H. Allen 1412 (N, W--1820068); Killip 3510 (W--1012167); Maurice 687 (W--1844117); Seibert 169 (N, N), 251 (I, N, N, N); Woodson, Allen, & Seibert 858 (N, N). COLOMBIA: Antioquia: Archer 307 (Fn--1662, Fn--2296, W--1541839), 415 (Fn--1661, W--1542010), 1235 (W--1542389); Barkley & Gutiérrez Villegas 1719 (Fn--3216, N); Barkley & Puccini B. 32 (Fn); Gaviria Neira & Barkley 17C236 (N); Gutiérrez Villegas & Barkley 17C522 (Fn--3389, N), 17C585 (Fn--3391, N); Gutiérrez Villegas, Barkley, & Correa Velásquez 12 (Fn), 13 (Fn), 15 (N, N); W. H. Hodge 6939 (Fn--2948, W--1950659); Killip, Barkley, & Daniel 39934 (N, W--1954195); D. Mesa Bernal s.n. (Fn--1658); Robledo & Astrálaga R. 40 (N); Tomas 81 (N); Toro Toro 26 (N), 97a (Fn--1660, N), 439 (Fn--1659, N); R. Torres 311 (Fn). Boyacá: Cuatrecasas 1698 (W--1773106); Grubb, Curry, & Fernandez-Perez 601 (W--2322528). Caldas: Dryander 2751 (F--1293802); Pennell, Killip, & Hazen 8593 (N). Cauca: Asplund 10639 (S, W--2224287); Cuatrecasas 19333 (N); F. C. Lehmann 5776 (N, N, S, W--1420377); Sneidern 578 (S), 1479 (S, W--1705932), 2554 (S, W--2103830), 4336 (F--1273545). Chocó: Araque Molina & Barkley 19Ch103 (N); Dugand & Jaramillo 3030 (Hn). Cundinamarca: André 618, in part (N); Ariste-Joseph 1003 (W--1185559); Dugand & Jaramillo 3853 (W--1853761); Ewan 15582 (N, W--2105807); F. R. Fos-

berg 20564 (N, W-2108727), 21008 (N, W-2108896); Grant & Giovanni 9672 (N, W-2106891); Niemayer 149 (W-1421249); Pérez Arbelaez 1207 (W-1517802); Schiefer 636 (Du-372831); M. Schneider 128 (S); Tarragón, Araque Molina, & Barkley 18Cul01 (Es, N). Huila: F. R. Fosberg 19249 [U. S. Nat. Arb. 282405] (W-2165313); Rusby & Pennell 588 (N); Sneidern 2555 (S). Magdalena: Angel 664 (N); Cuatrecasas & Castaneda 25296 (Fg). Norte de Santander: Cuatrecasas, Schultes, & Smith 12125 (Hn). Santander: Araque Molina & Barkley 18S211 (N); Barkley & Araque Molina 18S097 (N); Killip & Smith 16756 (N, W-1352453); Langenheim 3128 (Ca-78089). Tolima: F. W. Pennell 3211 (N), 3362 (N). Valle del Cauca: Cuatrecasas 14447 (N), 18052 (V1), 18574 (V1), 18654 (N), 20663 (N), 22877 (F-1341699); Duque 1605 (N, W-1744515); Garcia & Barriga 6443 (W-1744953); Holton 504 (T); Killip, Cuatrecasas, & Dryander 39207 (N, W-1856731); Moldenke & Moldenke 19791 (Es, N, Sm). Vaupés: Gutiérrez Villegas & Schultes 741, in part (Fn), 742 (N). Department undetermined: Apollinaire & Arthur 71 [Sabana] (W-603153); Funck & Schlim 637 (C). VENEZUELA: Aragua: Chardon 182 (W-1801129), 782 (Ve-12839); Fendler 852 (Br, Cb, N); E. G. Holt 376 (Ve), 377 (Cm), 380 (Cm), 443 (Cm); Moldenke & Moldenke 19550 (Es, Lg, N, Sm); Vogl 938 (N). Federal District: Bailey & Bailey 352 (Ba, W-1198320); Burkart 16016 (Ve); Collector undesignated 517 (S), s.n. (Ve-12846); Eggers 13053 (W-1234535), 13053a (W-1234536); D. Hummel s.n. [Caracas, 9/IV/1958] (Go, S); Kuntze 1263 (N); Lasser 725 (N); Linden 334 (Bm); H. Pittier 9732 (Ba, N, Ve, W-1069497); Potter 5100 (Ms); Tamayo s.n. [Herb. Est. Exp. Agric. 737] (W-1800661). Lará: Saer 329 (Ve). Mérida: Gehriger 219 (Ve, W-1499053), 533 (N, Ve); Gines 4685 (W-2167773); Hanbury-Tracy 24 (K), 256, in part (K); Jahn 535 (W-1120254); Lasser 415 (Ve-12838); E. Reed 610 (W-1618551). Miranda: Barrus s.n. [January 11, 1940] (It); E. G. Holt 441 (Ve); Moldenke & Moldenke 19562 (Es, Lg, N, Sm). Sucre: Funck 54 (Lu, V), 325 (Lu, V), 637 (Lu, V). Trujillo: Bellard s.n. [Aug. 1923] (W-1189293); Burkart 16815 (Ve); Gines 4312 (W-2167652). Zulia: Mocquerys 893 (W-2282493). State undetermined: Eggers 13453 [Los Lhorros] (W-1323147); Grosourdy s.n. [1862; Herb. Reichenb. f. 116382] (V); G. H. H. Tate 41 [Carapas] (W-1230834). ECUADOR: Azuay: Harling 625 (S); Rose, Pachano, & Rose 22845 (N), 22846 (N), 23805 (W-1023117). Cafar: W. H. Camp E.2495 (N, W-2056989). Chimborazo: Anthony & Tate 438 (W-1192501); Asplund 15501 (S); Penland & Summers 465 (N); Rimbach 671 (N, W-1742069); Rose & Rose 22538 (N, W-1022188). Cotopaxi: Harling 4867 (S). El Oro: Asplund 15820 (S). Guayas: Eggers 14372 (W-

1323014). Loja: R. Espinosa 58 (N); Harling 5774 (S). Los Ríos: Asplund 5577 (S, W-1930550). Napo-Pastaza: Asplund 18329 (S). Pichincha: Firmin 264 (W-1420227); I. Holmgren 564 (S, W-2059935); Moldenke & Moldenke 19785 (N). Santiago-Zamora: Harling 951 (S). Tunguragua: Pachano 11 (N, W-1044505). Province undetermined: André 618, in part [Facatativa] (N); Anthony & Tate 267 [Las Maquinas, West Andes] (W-1192346); Jameson s.n. [Republic of Ecuador; Herb. Reichenbach f. 125172 & 125205] (V, V). GALAPAGOS ISLANDS: Charles: N. J. Andersson 117 (Lu); A. Stewart 3321 (Gg-31372), 3322 (Gg-31371), 3323 (Gg-31377). Chatham: N. J. Andersson s.n. [1853] (Br, S), s.n. (S); Schimpff 132 (Gg-212448, S), 142 (Gg-212464, N, S); A. Stewart 3324 (Bi, Gg-31379, W-921600). Indefatigable: R. G. Taylor T.T.125 (N). PERU: Amazonas: Soukup 4119 (N). Ancash: R. Ferreyra 7451 (W-2049416). Arequipa: Cook & Gilbert 46 (W-603341); Hinckley & Hinckley 64 (Gg-31380, N, W-1197767). Cajamarca: Ochoa 1571 (N). Huánuco: H. A. Allard 20970 (N), 21013 (W-1999864); Asplund 13110 (S); Collector undesignated s.n. [Huancayo] (B); Ochoa 1059 (N), 1076 (N); Sandeman 3498 (K); C. Swingle 9 (W-2058172), 34 (N, W-2058190); Woytkowski 34175 (Ca-14296), 34503 (Ca-14186). Junín: Killip & Smith 21925 (W-1357031); Macbride & Featherstone 1705 (S); Sandeman 4566 (K). La Libertad: S. Castañeda 2906 (S); Ellenberg 1783 (Ut-115379b), 1921 (Ut-115382b); Eyerdam 8897 (Ca-655574); Née 87 (Q); E. G. Smyth 25 (W-1802244); J. West 8190 (Ca-565217). Lima: P. Aguilar F. 1079 [27 Feb.] (N), 1079 [20 July] (N); N. J. Andersson s.n. [S. Lorenzo, 1852] (S); Asplund 11096 (S); Collector undesignated s.n. [Lima] (B); Cook & Gilbert 2088 (W-703675); Ellenberg 28 (Ut-115396b), 2771 (Ut-115387b); R. Ferreyra 4087 (N, Ug), 4088 (N); Ochoa 1133 (N); F. W. Pennell 14770 (N, W-1340936); Rose & Rose 18548 (N, W-761230); Soukup 1778 (W-1830704); Stork & Vargas 9329 (Ca-655898); Wilkes s.n. [Callao] (W-71951). Loreto: Ducke s.n. [Herb. Jard. Bot. Rio Jan. 25594] (N); C. Swingle 89 (W-2058216); Tessmann 4205 (Hb, S); Ll. Williams 452 (Bi), 743 (W-1496857), 2588 (W-1496664), 2654 (La). San Martín: H. A. Allard 20400 (Ca-926311), 21805 (W-2025215); Spruce 4172 (Br, N). Piura: Ochoa 1757 (N). Tacna: H. H. Rusby 910 (C, Mi, Mi, Pa, Pr, W-71997), 913 (C, Pa). Department undetermined: L. Fernandez 16506 (Kr). BRAZIL: Federal District: Frazão s.n. [Herb. Jard. Bot. Rio Jan. 7463] (N); Ochioni 523 [Herb. Jard. Bot. Rio Jan. 55246] (N). Minas Gerais: Assis 239 (G, N, W-1932526); Mendes Magalhães 2219 (Be-13790), 3151 (Be-14816, W-2124321); Warming s.n. [Lagoa Santa] (N); L. O. Williams 5650 (G, N). Paraná: Braga & Lange 85 (Bm); Dusén 2490 (Ja-14846), 7827 (N), 10856 (I, Mi, N),

s.n. [Herb. Jard. Bot. Rio Jan 2490] (N), s.n. [Herb. Jard. Bot. Rio Jan. 14846] (N); Reiss 56 (I); Stellfeld 1109 (N), 1134 [Herb. Mus. Paran. 2145] (N), 1260 [Herb. Mus. Paran. 2371] (N), s.n. [Herb. Mus. Paran. 1634] (N). Rio de Janeiro: O. M. Barth I.38 [Herb. Inst. O. Cruz 166] (W-2342932); Dias dos Santos & Frota Pessoa s.n. [Terezopolis, Feb. 25, 1942] (Ja-46795); Diogo 506/606 (Ja-46766); C. V. Freire s.n. [Herb. Mus. Nac. Rio Jan. 16522] (N); G. Gardner 233 (M); Glaziou 14162 (N); Góes & Constantino 297 [Herb. Jard. Bot. Rio Jan. 51881] (N); A. Lutz 430 (Hk); B. Lutz 1185, in part (N, N, N); Mello Filho s.n. [Terezopolis, Feb. 1942] (Ja-46789); J. T. Roig 14386 (Es); Rose & Lutz 6 (Gg-366822); Sampaio 1645 (Ja-46501), 4867 (Ja-46508), 7580 (Ja-46512), 7619 (Ja-46513), s.n. [Petropolis, Mar. 1, 1936] (Ja-46747); H. P. Velloso 10 (Ja-46536); J. Vidal II.5074 (Ca-169487). Rio Grande do Sul: Henz 32646 (N); Leite 249 (N); Lindman A.475 1/2 (S); Moldenke & Moldenke 19680 (Es, Lg, N); Rambo 436, in part (N), 436b (Ok), 45117 (Go), 46416 (W-1997405); Reineck & Czermak 63 (Ug); Reitz C.516 (N); Sehnem 1436 (N), 3519 (Gg-356385). Santa Catarina: Ule 1067 (W-1323100). São Paulo: Campos Novaes 114 (N, Sp-15719); C. A. Krug s.n. [Herb. Inst. Bot. S. Paulo 4000] (W-1775606); Moldenke & Moldenke 19633 (Es, Lg, N, Sm); Pickel 5301 (Sp-45703); L. Roth 866 (Sp-51477). State undetermined: Sellow s.n. [Brasilia] (Br). BOLIVIA: Cochabamba: Steinbach 5901 (Cb). El Beni: Buchtien 5889 (W-1159358), 5890 (W-1159363). La Paz: M. Bang 204 (Mi, Pa, W-71947); Buchtien 197 (N), 354 (W-1159362), 1497 (S); Mandon 524 [Macbride photos 24681] (Kr-photo, N, N-photo, S); H. H. Rusby 907 (Pa). Santa Cruz: Peredo s.n. [Cabezas, Cordillera, 29-II-1946] (N), s.n. [La Pampa de La Cruz, 23-IV-1946] (Gg-353261, N), s.n. [Las Juntas, 10-II-1947] (N); Steinbach 3137 (N), 6757 (Bm, Ca-368483, S, Ut-91359). PARAGUAY: W. A. Archer 4788 (N, W-1705542); Fiebrig 4432 (V), 4635 (Bm, V); Hassler 1242 (N), 2585 (N, V), 3135 (N), 5203 (Ca-935080, N), 11539 (Ca-930261, N); Jørgensen 3767, in part [Villarica, 10.I.1929; Herb. Osten 22248] (Du-197905, S, Ug, W-1483924); Lindman A.3647 (S, S), A.3651 (N, S); Lorentz 108 (B); T. Rojas 13556 (Go), 1889 [Herb. Hort. Parag. 10054; Herb. Osten 13556] (Ug), s.n. [Puerto Colonia Risco, Dec. 1916; Herb. Osten 13557] (S). URUGUAY: Castellanos s.n. [Bella Unión, Jan. 28, 1948; Herb. Inst. Miguel Lillo 15188] (N), s.n. [Playa Atlántida, Dec. 29, 1946; Herb. Inst. Miguel Lillo 15195] (N), s.n. [Punta del Este, Dec. 27, 1946; Herb. Inst. Miguel Lillo 11757] (N), s.n. [Valle Edén, Feb. 18, 1947; Herb. Inst. Miguel Lillo 15758] (N), s.n. [San Carlos, Jan. 16, 1947; Herb. Inst. Miguel Lillo 15760] (N); Gallinal, Aragone, Bergalli, Camp-

al., & Rosengurtt 1269 (N), PE.5483 (N); Herb. Herter 9661 (N), 95078 (N), 95525 (N); Herter 269 [Herb. Herter 81713] (B, Ca-314284, S, Sp—26634), 269b [Herb. Herter 78724] (He), s.n. [Herb. Osten 18489] (Ug), s.n. [Herb. Osten 18491] (Ug), s.n. [Herb. Osten 18497] (Ug), s.n. [Herb. Osten 19034] (Ug); Moldenke & Moldenke 19691 (N), 19697 (N); Osten 2830 (Ug), 3335 (Ug), 4646 (Ug); Rosengurtt A.1241 (N), B.507 (N). CHILE: Atacama: Morong 1204 (C). Colchagua: Barros Valenzuela 8046 (N). Concepción: Looser 3995 (N). Coquimbo: Barros Valenzuela 8041, in part [Terena] (N); Biese 2109 (N); Field s.n. [neighborhood of Coquimbo] (Br); Looser 5506 (N). Curicó: Barros Valenzuela 8040 (N); Herb. Mus. Nac. Chile 15 (N). Malleco: Kunkel 2500 (Cb). Santiago: Barros Valenzuela 8225 (N), 8226 (N). Valparaíso: N. J. Andersson s.n. [Valparaiso, 1853] (S, S, S); Buchtien s.n. [18/10/95] (B, B, S, W—1159370); Claude-Joseph 3550 (W—1283381); Garaventa 1661 [Herb. Looser 4026] (N); T. H. Goodspeed 23326 (Ca—657479); W. H. Harvey s.n. [Valparaiso, April-July 1856] (S); Killip & Pisano 39746 (N, W—1954028); Looser 1401 (N), 4033 (N); Moldenke & Moldenke 19769 (N); R. A. Philippi 1302 (W—1323097); Wilkes Exped. s.n. [Valparaiso] (T). Province undetermined: Barros Valenzuela 8041, in part [Cerro de la Virgen, Viufia] (N); C. Gay 794 (Br, N); Petré s.n. [Emellan] (S). JUAN FERNANDEZ ISLANDS: Masatierra: G. T. Hastings 225 (W—530155); C. Ingram s.n. [1938] (Bm); C. Skottsberg 401 (Go, Lu, S); Skottsberg & Skottsberg 180 (Go, S). Island undetermined: D. Douglas 35 (Lu), 40 (Lu). ARGENTINA: Buenos Aires: R. Alvarez 183 (S), 311 (N); N. J. Andersson s.n. [Buenos Ayres, 1852] (S); Cabrera 1657 [Herb. Osten 22285] (Ug), 4317 (N); Chicchi 5 (N); Collector undesignated s.n. [La Boca, 29 June '82] (C); G. Dawson 946 (N); Moldenke & Moldenke 19710 (N), 19711 (N); Née 115, in part (Q); Nicora 574 (W—2196467); Venturi 68 (S), 93 [Herb. Inst. Miguel Lillo 31395] (N); Wall & Sparre s.n. [El Aroma, 27/10/46] (Ew, Ew, Ew). Catamarca: A. Brizuela 986 (N); J. Brizuela 130 (N); Cabrera 1186 (N); Jürgensen 1295 [Herb. Osten 11348] (Ug); Luna Risso 281 (N), 959 (Es, N), 1097 (N); T. Meyer 12546 (N); Venturi 7076 [Herb. Osten 20839] (Gg—160630, Ug, W—1591383). Chaco: R. M. Aguilar 803 (N). Córdoba: Balegno 893 (N); Bruch 2835 (N, N, Ug); Castellanos s.n. [Valle de los Reartes; Herb. Osten 15278] (Ug), s.n. [Herb. Mus. Argent. Cienc. Nat. 31201] (N), s.n. [Herb. Mus. Argent. Cienc. Nat. 31203] (N); J. Gutiérrez 113 (N); Kuntze s.n. [XII.1891] (N); Moldenke & Moldenke 19713 (N); Pierotti 5144 (Es, N); Rodrigo 2310 (N); Villafane 3351 (N). Corrientes: Castellanos s.n. [Herb. Mus. Argent. Cienc. Nat. 34487] (N); Ruiz Huidobro 3684 (N), 3831 (N), 3882 (N), 4190 (N, We), 4275 (N), 4347 (N), 4358 (N), 4394 (N), 4625 (Es, N, We), 4710 (N, N). For-

mosa: I. Morel 676 (N), 806 (N), 1392 (N), 1460 (N), 1657 (N, Rf), 1695 (N), 1759 (N), 1831 (N), s.n. [Riacho Portefolio, IX/1946] (N); S. A. Pierotti 4200 (N, N). Jujuy: Moldenke & Moldenke 19749 (Lg, N), 19751 (Lg, N). Mendoza: Ruiz Leal 868 (Rl); Smitt s.n. [1890-91] (S). Misiones: Ekman 2017 (N, S), 2030 (Mi); Lillieskold s.n. [vic. Colonia Bonpland] (S); Medina 128 (N); T. Meyer 11594 (N); G. J. Schwarz 2280 (N), 3898 (Au--122318, N); Schwindt 7 (N). Salta: Garolera & Romero s.n. [15-I-1947] (N); Malvarez 137 (N); Moldenke & Moldenke 19737 (N), 19742 (Es, Lg, N, Sm); Venturi 5471 (V). Santa Fé: R. Alvarez 900 (N), 951 (N); Job 686 (N), 1042 (N); Ruiz Leal 14252 (Rl); Terribile 382 (N), 435 (N), 556 (N); Wall & Sparre s.n. [Rosario, 8/11/46] (Ew). Santiago del Estero: Pierotti h, in part [Herb. Inst. Miguel Lillo 100888] (Bm). Tucumán: Moldenke & Moldenke 19725 (N), 19726 (N), 19727 (N); Monetti 185 [Herb. Osten 10871] (Ug), 1719 [Herb. Inst. Miguel Lillo 31400] (N); O'Donell 68 [Herb. Inst. Miguel Lillo 36206] (N); Olea 198 (Ca); F. Ortiz s.n. [30/5/45] (Ca); Osten 10615 (Ug); Rocha 3830 (Vi, Vi); Ruiz Leal 12404 (Ss); Schreiter 967 [Herb. Osten 15045] (Ug), s.n. [Cadillal, Nov. 11, 1917; Herb. Osten 12178] (Ug); Terribile 106 (N), 252 (N), 357 (N); L. A. Varela s.n. [Macomita, 10-III-1944] (N); Venturi 50 (W-1591209); E. Villa 686 (N); Wall & Sparre s.n. [S. Javier, 11/11/46] (Ew), s.n. [Avenida de Lima, 11/11/46] (Ew, Ew), s.n. [Avenida de Lima, 12/11/46] (Ew), s.n. [La Famailla, 11/11/46] (Ew, Ew). GERMANY: Schulz & Schulz s.n. [Berlin, 3.10.1898] (B). REPUBLIC OF SOUTH AFRICA: Natal: Meebold 12826 (Mu); J. M. Wood 12122 (Ew), 13132 (Bi, Vi). Transvaal: Rodin 3917 (S, W-1991h41). MIDWAY ISLAND: Meagher s.n. [July 7, 1933] (N), s.n. [July 7, 1937] (Bi). HAWAIIAN ISLANDS: Hawaii: M. Brown s.n. [Kilauea, July 10, 1931] (We, We); C. N. Forbes 465h (Bi); Hosaka 2122 (Bi); A. R. Moldenke 77 [H. N. Moldenke 21813] (Mi), 79 [H. N. Moldenke 21816] (Mi); Rubtakoff 2615 (Mi). Kauai: C. N. Forbes 272k (Bi); A. A. Heller 2046, in part (Bi, Bi, Bz-23740, C, Ca-504930, Gg-163104, Mi); Kusche 70 (Gg-31378); A. R. Moldenke 87 [H. N. Moldenke 21844] (Mi); H. N. Moldenke 21839 (Mi). Lanai: C. N. Forbes 188.2 (Bi); G. C. Munro 141 (Bi, N), 292 (Bi). Maui: C. N. Forbes 1083m (Bi, W-1579108), 2036m (Bi); H. N. Moldenke 21826 (Mi), 21827 (Mi). Molokai: O. Degener 17852 (N, S); A. S. Hitchcock 15161 (W-892415); H. N. Moldenke 21835 (Mi). Niihau: J. F. G. Stokes s.n. [Ponds on southern end, January 1912] (Bi), s.n. [South half of island, January 1912] (Bi, Bi), s.n. [January 1912] (Ba). Oahu: N. J. Andersson s.n. [Honolulu, 1852] (N, S, S); O. Degener 17854 (N); Eastwood s.n. [Honolulu, August 1-16, 1924] (Gg-34500); F. E. Egler 37-83 (Bi); C. N. Forbes s.n. [Valley above Country Club,

July 8, '08] (Bi), s.n. [Tantalus Rd., 7/18/30] (Bi); F. R. Fosberg 8856 (Bi, N), 10276 (Bi, Du—239417, N, Up); D. W. Garber 339 (Bi); H. W. Graham 3 (Cm); Grunow s.n. [Juli 1884] (V—5814); K. Harley s.n. [Waianae, May 4, 1956] (Bi); Hasegawa s.n. [Makaha Valley, April 3, 1932] (Bi); A. A. Heller 2046, in part (W—262858); Herb. Oahu Coll. 65 (Mi); A. S. Hitchcock 13726 (W—898819); C. H. Hitchcock s.n. [Honolulu] (Dt); Hosaka 1354 (W—1993415); E. P. Hume 123 (Bi); S. W. Hutchinson 6030 (Bl—13769); C. S. Judd 11 (Bi); Kelly 12 (Gg—31463); Riggs s.n. [Honolulu, July 1908] (Or—8850); J. F. C. Rock 3007 (Bi); P. Russell 52 (Bi). Island undetermined: Mann & Brigham 437 (Bi). AUSTRALIA: New South Wales: Kaspiew s.n. [Moss Vale, 4.6.51] (Ew); Valentin s.n. [6/11/1927] (S, S), s.n. [13 Mars 1928] (S). Queensland: Kingston K.83 (Ng—16847, Ng). AUSTRAL ISLANDS: Raivavae: Chapin 857 (N); Quayle 258 (Bi); Saint John & Fosberg 15869 (Bi). Rapa: Chapin 893 (Bi, N); C. C. Curtis 307 (Bi); Herb. Whitney Exped. 307 (W—1968131), 337 (Bi); Saint John & Fosberg 15235 (Bi); A. M. Stokes 195 (Bi). Tubuai: Saint John & Fosberg 16280 (Bi). GAMBIER ISLANDS: Aukena: H. Saint John 14632 (Bi). Mangareva: Agassiz 122 (W—1652126); H. Saint John 14570 (Bi). EASTER ISLAND: Agassiz 20 (Go); Chapin 1024 (N); Gusinde s.n. (Go); Herb. Exped. Franco-belge s.n. [Rano-Kao, 7/10/1934] (Br), s.n. [Rano-Aroi, 18/10/34] (Br). CULTIVATED: Belgium: M. Martens s.n. [h. b. lov. 1837] (Br); Van Heurck 32 (Cp). France: Herb. Decaisne s.n. [h. p.] (Br). Java: Hallier D.589 (Bz—23718, Bz—23719, Bz—23720), D.590 (Bz—23721, Bz—23722); Herb. Hort. Bot. Bogor. XV.K.A.XLV. 17 (Bz—26442, Bz—26443). New York: Eggleston s.n. [seed from Madrid, 1905; N. Y. Bot. Gard. Cult. Pl. 23202] (N). Spain: Herb. Hort. Reg. Matrit. 46 (Q). Sweden: Reuterman s.n. [12/9/1889] (Go). LOCALITY OF COLLECTION UNDETERMINED: Collector undesignated 2933 (Vi); Herb. Mus. Bot. Stockholm s.n. (S).

VERBENA LITORALIS var. ALBIFLORA Moldenke, Phytologia 1: 432. 1940.  
 Bibliography: Moldenke, Suppl. List Common Names 23. 1940; Moldenke, Phytologia 1: 432 (1940) and 1: 511. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 19 & 101. 1942; Moldenke, Castanea 13: 115. 1948; Moldenke, Alph. List Cit. 2: 542. 1948; Moldenke, Phytologia 3: 133. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 33, 61, & 198. 1949; Moldenke, Résumé 39, 69, & 472. 1959; Moldenke, Résumé Suppl. 6: 6. 1963.

This variety differs from the typical form of the species in having white corollas.

The type of the variety was collected by George B. Hinton (no. 13965) in a llano at an altitude of 1000 meters, at Coalcoman, district of Coalcoman, Michoacán, Mexico, on July 20, 1939, and is deposited in the herbarium of the University of California at

Los Angeles. The form ascends to 2700 meters altitude in Chocó. A vernacular name recorded for it is "verbena blanca", inaccurately given for the typical form of the species in my "Supplementary list of common and vernacular names...." in 1940.

In all, 6 herbarium specimens, including the type, and 2 mounted photographs have been examined.

Citations: MEXICO: Michoacán: Hinton 13965 (La—type, N—photo of type, Z—photo of type). COLOMBIA: Antioquia: F. A. Barkley 17C346 (Fn—3223, N). Chocó: Araque Molina & Barkley 19ChO10 (N, W—1999624). PERU: San Martín: H. A. Allard 20399 (W—1999720).

*VERBENA LITORALIS* var. *CARACASANA* (H.B.K.) Briq., Ann. Conserv. & Jard. Bot. Genève. 7-8: 292. 1904.

Synonymy: *Verbena caracasana* H.B.K., Nov. Gen. & Sp. Pl. 2: 275—276. 1818. *Verbena caracasana* Humb. ex Spreng. in L., Syst. Veg., ed. 16, 2: 748. 1825. *Verbena caracassana* H.B.K. ex Cham., Linnaea 7: 255. 1832. *Verbena caracasana* Humb. & Bonpl. ex Steud., Nom. Bot., ed. 2, 2: 750. 1841. *Verbena caracasana* Humb. & Kunth ex D. Dietr., Syn. Pl. 3: 601. 1843. *Verbena caracasana* Kunth ex Schau. in A. DC., Prodr. 11: 542, in syn. 1847. *Verbena litoralis* var. *caracasana* Briq., Ann. Conserv. & Jard. Bot. Genève. 7-8: 292. 1904. *Verbena litoralis* var. *caracasana* (Kunth) Briq. ex Moldenke, Suppl. List Invalid Names 25, in syn. 1947. *Verbena litoralis* var. *caracassana* Briq. ex Moldenke, Résumé 369, in syn. 1959.

Bibliography: H.B.K., Nov. Gen. & Sp. Pl. 2: 275. 1818; Spreng. in L., Syst. Veg., ed. 16, 2: 748. 1825; Steud., Nom. Bot., ed. 2, 2: 750. 1841; Cham., Linnaea 7: 255. 1832; D. Dietr., Syn. Pl. 3: 601. 1843; Walp., Repert. Bot. Syst. 4: 19. 1845; Schau. in A. DC., Prodr. 11: 542. 1847; Schau. in Mart., Fl. Bras. 9: 189. 1851; Hook. f. & Jacks., Ind. Kew. 2: 1178. 1895; Briq., Ann. Conserv. & Jard. Bot. Genève. 7-8: 292. 1904; Briq. in Chod. & Hassler, Plant. Hassler. 10: 481. 1904; Fedde in Just, Bot. Jahrsber. 33 (1): 632. 1906; Moldenke, Prelim. Alph. List Invalid Names 45 & 47. 1940; Moldenke, Alph. List Invalid Names 46 & 48. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 44 & 101. 1942; Moldenke, Alph. List Invalid Names Suppl. 1: 23 & 25. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 61, 106, & 198. 1949; Moldenke, Alph. List Cit. 3: 808 (1949) and 4: 1074. 1949; Moldenke, Résumé 69, 127, 361, 368, 369, & 472. 1959; Moldenke, Résumé Suppl. 3: 12, 14, 37, & 40 (1962) and 4: 14. 1962; Moldenke, Phytologia 8: 314 & 317 (1962) and 9: 67 & 151. 1963; Moldenke, Résumé Suppl. 8: 5. 1964.

The original description of this taxon by Kunth (1818) is as follows: "V. caule erecto, ramoso, ramis quadrangularibus, glabris; foliis oblongis, acutis, grosse crenato-serratis, strigoso-scabris; spicis filiformibus, paniculatis. Crescit rarissime in sylvaticis prope Caracas, alt. 430 hex. Floret Januario. CAULIS erectus, subquadripedalis, ramosus; ramis quadrangularibus, substriatis, glabris. FOLIA opposita, subsessilia, oblonga, superi-

ora lanceolata, acuta, basi cuneata, grosse serrata, serraturis rotundatis, apice acutis, alternis minoribus, rigida, reticulato-venosa, nervo medio venisque primaris subtus prominentibus, supra pilis minutis adpressis scabra, subtus in nervo medio venisque strigosa, quadri- aut quinquepollicaria, sesquipolligem et paulo latiora. SPICAE terminales, paniculatae (in specimine suppetente quinque oppositae, inferiores distantes, longissime pedunculatae), filiformes, pedunculatae. FLORES sessiles, bracteati, minutti. BRACTEAE lanceolatae acuminatae, glabriuscule, calycem subaequantes. CALYX generis, hispidulus. COROLLA pallide violacea; tubus calyce longior; limbus quinquefidus, planus; laciniis rotundatis, subemarginatis. STAMINA ET PISTILLUM generis. FRUCTUS calyce persistente inclusus, elliptico-tetragonus, quadrilocularis, quadripartibilis, sulcatus, fuscescens, glaber, magnitudine grani sinapis; loculis monospermis."

The type of this perplexing taxon was collected by Aimé Jacques Alexandre Bonpland at or near Caracas, Venezuela, and was probably deposited in the herbarium at Berlin now destroyed. It seems very possible — and probable — that this variety should be reduced to synonymy under typical V. litoralis H.B.K., even though Kunth, Chamisso, and Walpers considered the two taxa sufficiently distinct to warrant separate specific designation. Unfortunately, I have not yet been able to examine any of the original Bonpland material — if, indeed, this is still extant — nor even the Hassler material (nos. 1027 and 1027a from Paraguay) cited by Briquet when he reduced the species the varietal status. Briquet was of the opinion that V. caracasana was the same taxon as Schauer's V. litoralis ♀ leptostachya, which I regard as typical V. litoralis. Schauer also regarded the Bonpland plant as identical with his variety, apparently using the Herb. Willdenow 1113½ specimen labeled V. lanceolata by Willdenow as typifying the H.B.K. name. Chamisso (1832) also gives Willdenow's name as a synonym of the H.B.K. name, commenting: "E Brasilia meridionali 'Campo, Rio-pardo' misit Sellowius. Diversa nostra ab Humboldtiana stirpe, ut planta campestris sitiens a sylvestri vel palustri. Folia illi pollice saepius breviora vix unquam bipollicaria (nec 4—5-pollicaria), superiora linear-lanceolata integerrima, inferiora tantum serrata. Ramosior est, ramis gracilioribus striatis, angulis insignius nervosis, caeterum differentia nulla." Steudel (1841) likewise reduces V. lanceolata Willd. to V. caracasana H.B.K. Whether this course of action is justified or not, I cannot as yet say, not having seen the Willdenow specimen myself as yet. It is possible that Willdenow's plant was not part of the type collection of V. caracasana. Schauer's variety, moreover, was based on various other collections in addition to the Willdenow Herbarium specimen.

All things considered, therefore, it seems best to hold the variety apart tentatively until these matters can be settled definitely. In my publications prior to the year 1942 I reduced the variety to V. litoralis, but from 1942 onwards have kept it

separate.

If the specimens cited below really represent var. caracasana, then the corolla is said to be blue-violet, it flowers in July, and has been found at altitudes of 2300 to 2400 meters.

It should be noted here that the original publication is often cited as "1817".

It is possible that the Hummel s.n., cited by me under typical V. litoralis, from Caracas, is actually var. caracasana, since its spikes are abnormally dense; the same is true of Demaree 24649 from Arkansas.

Briquet's notes when he established the trinomial here employed are worth repeating: "Var. caracasana Briq. = V. caracasana Kunth in Humb. et Bonpl. Nov. gen. et sp. II, 275 (ann. 1817) = V. litoralis (sphalm. littoralis) var. leptostachya Schauer in DC. Prodr. XI, 542 (ann. 1847). Mbocaiati, près de Villa-Rica, champs en friche, février 1876, fleurs d'un bleu pâle (n. 1027a); plaine de Pirayu-Bi, 11 février 1876 (n. 1027). Nous avons rétabli les noms primitivement adoptés pour ces deux formes par Kunth et arbitrairement changés par Schauer souvent trop peu scrupuleux dans les questions de nomenclature."

The Kuntze 2109, distributed as V. caracasana, seems to be typical V. litoralis H.B.K. On the other hand, it seems very possible to me that many of the specimens cited under typical V. litoralis which have unusually dense spikes — as, for instance, most of those from the Hawaiian Islands — may represent var. caracasana.

Citations: COLOMBIA: El Cauca: Pérez Arbeláez & Cuatrecasas 5981 (W--1774215). ARGENTINA: Mendoza: Carette 3050 (N).

VERBENA LITORALIS var. MELANOPOTAMICA Hauman-Merck, Anal. Mus. Argent. Hist. Nat. Buenos Aires 24: 413 [as "littoralis"]. 1913.

Bibliography: Hauman-Merck, Anal. Mus. Argent. Hist. Nat. Buenos Aires 24: 413—414. 1913; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 44 & 101 (1942) and [ed. 2], 106 & 198. 1949; Moldenke, Résumé 127 & 472. 1959; Moldenke, Résumé Suppl. 3: 40. 1962.

This variety differs from the typical form of the species in its conspicuous corolla, which is hypocrateriform, pale-blue, 3—4 mm. long, with the limb equally as long as the conic tube.

The type of the variety was collected by Lucien Hauman-Merck (no. 345) under trees on the shores of the Río Negro and certain of its islands, Río Negro, Argentina, where he says that it is very abundant. He states that the variety may be recognized on sight by its pale-blue flowers which are larger than those of all other species and forms of this group (leading him to the question "An species distincta?"). He describes the plant as glabrous, hardly scabrous, with short spikes which are very thin, and the corolla-tube hardly longer than the calyx. He is of the

opinion that this plant is very closely related to V. litoralis, from which it differs on sight by the size and form of its flowers, by the larger and subcordiform bractlets, and by the enlarged conic corolla-tube.

The author's surname is sometimes misspelled "Haumann-Merck" in literature.

**VERBENA LOBATA** Vell., Fl. Flum. 18 (1825), Icon. 1: pl. 43. 1827.

Synonymy: Verbena buchnera Vell., Fl. Flum. 17 (1825), Icon. 1: pl. 42. 1827. Verbena corymbosa Cham., Linnaea 7: 255. 1832 [not V. corymbosa Hort., 1845, nor Ruiz & Pav., 1798]. Verbena lobata Arrab. ex Steud., Nom. Bot., ed. 2, 2: 750. 1841. Verbena corymbosa Reh. ex Moldenke, Alph. List Invalid Names Suppl. 1: 23, in syn. 1947. Verbena lovata Vell. ex Moldenke, Alph. List Cit. 2: 367, sphalm. 1948.

Bibliography: Vell., Fl. Flum. 17—18 (1825), Icon. pl. 42 & 43. 1827; Cham., Linnaea 7: 255. 1832; Steud., Nom. Bot., ed. 2, 2: 750. 1841; Walp., Repert. Bot. Syst. 4: 27. 1845; Schau. in A. DC., Prodr. 11: 540. 1847; Schau. in Mart., Fl. Bras. 9: 184—185. 1851; Hook. f. & Jacks., Ind. Kew. 2: 1178 & 1179. 1895; Stapf, Ind. Lond. 6: 429 & 430. 1931; Moldenke, Prelim. Alph. List Invalid Names 56. 1940; Moldenke, Alph. List Invalid Names 46. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 39, 44, & 101. 1942; Sampaio & Peckolt, Arquiv. Mus. Nac. Rio Jan. 37: 392 & 393. 1943; Moldenke, Alph. List Cit. 1: 21, 255, & 290. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 23. 1947; Moldenke, Castanea 13: 117. 1948; Moldenke, Alph. List Cit. 2: 362, 364, 366, 367, 369, 375, 444, 448, 534, 535, 621, & 624 (1948), 3: 670, 696, 751, 772, 824, 840, 862, 921, & 922 (1949), and 4: 984, 1075, 1081, 1094, 1248, 1249, 1251, & 1287. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 94, 106, & 198. 1949; Moldenke, Phytologia 3: 75 (1949) and 3: 288 & 289. 1950; Stellfeld, Trib. Farmac. 19 (10): 166. 1951; Rambo, Sellowia 6: 153. 1954; Biol. Abstr. 27: 3735. 1955; Rambo, Sellowia 7: 260. 1956; Angely, Fl. Paran. 7: 13. 1957; Moldenke, Résumé 110, 119, 127, 360, 362, & 472. 1959; Moldenke, Résumé Suppl. 2: 10—12. 1960; Angely, Fl. Paran. 16: 78 (1960) and 17: 46. 1961; Reitz, Sellowia 13 (13): 110. 1961; Moldenke, Phytologia 8: 247 (1962) and 9: 40, 44, & 292. 1963.

Illustrations: Vell., Fl. Flum. Icon. 1: pl. 42 & 43. 1827.

Low-growing rather weak herb, 0.5—1.3 m. tall, more or less hispid throughout; rhizome creeping; stems slender, tetragonal, rooting at the lower nodes, ascending at the tips, brachiate; branches often elongate, ascending, very wide-spreading, floriferous and ascending at the apex; leaves decussate-opposite; petioles about 1 cm. long; leaf-blades membranous, triangular-ovate, to about 4 cm. long and 2.5 cm. wide, below the middle rather deeply subtrilobed with 2 lateral incisions, acute at the apex, truncate or subcordate at the base and cuneately attenuate into the petiole, rugose, more or less strigose-hispid or

-hirtous and subcanescent above, the margins coarsely and irregularly incised-serrate, the teeth ovate, mucronate-acuminate; spikes very short, ternate, forming a wide-spreading panicle, compact and congested during anthesis, divaricate-cymose and somewhat patent in fruit, but even then scarcely longer than 1 cm.; peduncles filiform, 4-5 cm. long; flowers imbricate, short-pedicellate; bractlets ovate, about half as long as the calyx, acuminate at the apex, ciliate along the margins; calyx about 4 mm. long, pilose-hirtous or -hirtellous on the outer surface, eglandular, its rim short-dentate, the teeth ovate and acuminate; corolla small, varying from light-violet or violet to blue-lilac or purple (also described as "roxa" and "anil"), its tube infundibular, about one-fourth longer than the calyx, the throat villous; fruit about half as long as the calyx; cocci striate on the dorsal surface, subrugose-reticulate on the upper portion.

The type of this curious species was collected by José Mariano da Conceicao Velloso probably at or near Rio de Janeiro, Brazil, but is now lost. Schauer (1851) says: "Species omni nota per insignis, V. corymbosae R. et P. cui adnumeravit ♀ Chamiso in Coll. pl. Sellow., sane quadammodo affinis, sed ab ea caule paniculaque brachiatis, foliis petiolatis, floribus minoribus aliisque notis uberrime distincta." Walpers (1845) erroneously reduces it to synonymy under V. corymbosa Ruiz & Pav.

Leite refers to this plant on a herbarium label as "frutex", but as far as I am able to ascertain it is completely herbaceous. Irwin describes it as an "occasional" herb creeping beneath low shrubs and among rocks. It has also been collected in shrubby moist fields and grassy campos, in wet sunny places in riverbank thickets, at the edges of marshes, in hedges, at the margins of small woods, and at the edge of primeval forests, as well as in wet thickets, at altitudes of 60 to 3130 meters, flowering from August to May. Smith & Klein describe it as ruderal. Rambo found it growing in a region of 2-2.5 meters rainfall and 0-25° C. temperature. Dusén 313 shows extra large leaves, while Müller 92 exhibits very large (or especially well pressed?) corollas.

Herbarium material of this species has been misidentified and distributed as V. corymbosa Ruiz & Pav., V. megapotamica Spreng., and V. strigosa Cham. On the other hand, the Weir 319, distributed as "Verbena sp. near V. lobata Vell.", is V. hirta var. gracilis Dusén.

The type of V. corymbosa Reh. is Sellow s.n. [Brasilia] deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels. Verbena corymbosa Hort. is a synonym of V. bonariensis L., while V. corymbosa Ruiz & Pav. is a valid species, which, as Schauer points out, somewhat resembles this one. Stellfeld (1951) cites Herb. Mus. Paran. 1504 & 3053 from Paraná, Brazil, not as yet seen by me.

In all, 126 herbarium specimens and 3 mounted photographs or illustrations have been examined by me.

Citations: BRAZIL: Espírito Santo: Irwin 2783 (Au--173707, N,

W—2281319); A. Lutz 1159 (Z). Minas Gerais: Brade 14672 [Herb. Jard. Bot. Rio Jan. 26211] (B); Campos Porto 1147 [Herb. Jard. Bot. Rio Jan. 22565] (N); Collector undesignated s.n. [Serra do Piauí, Dec. 10, 1886] (Ja—46596); Dusén 242 (S), 313, in part (W—1199407), s.n. [Serra do Itatiaia, 17/5/1902] (S); Lobo s.n. [Planalto do Caparaó, Nov. 1922] (Ja—46521); Schwacke s.n. [Campos de Caparaó, 9/II/1890] (Ja—46586). Paraná: Curiel s.n. [Hatschbach 403] (N); Dusén 2660 (Ja—46801, N, S), 6821 (Ca—501689, Lu, N, S, W—11481773), 8771 (S), 9287 (S), s.n. [Cubalóia, 27.12.1911] (S); Hatschbach 337 (N), 1622 (N), 2873 (N), 4156 (Ok), 4308 (Mm); Mattos & Moreira s.n. [11/1959] (Ih—5909); Tamandaré 107 (Mp—11140); Tessmann 3360 [Herb. Mus. Paran. 3360] (N), s.n. [Herb. Mus. Paran. 3033] (N). Rio de Janeiro: Brade 16778 [Herb. Jard. Bot. Rio Jan. 44872] (N); Dusén 242 (Ja—46562, Sp—20063), 313, in part (Ja—114844); Emygdio 34 (Ja—38710, N), 107 (Ja—38709, N); Herb. Mus. Paulista 498 (N, Sp—15722); Moldenke & Moldenke 19616 (Mg, Mr, N, No, Ot, Pn, S, Sm); Segadas-Vianna 670 (Ja), 2908 (Ja), 5035 [Herb. Brade 20319] (Ja); Ule 4341 (Ja—46528). Rio Grande do Sul: Bornmüller 602 (Ut—47123); Jürgens 469 (B, W—11482202); Leite 741 (N); Rambo 2293 (N), 4482 (Sp—50986), 35193 (Lg, N, S), 36418 (S), 51462 (N, W—2102042), 51505 (N), 51912 (N), 52084 (N, S, W—2102316); Sehnem 3497 (Gg—356200). Santa Catarina: Fritz Müller 92 (Ja—31555), 97 (Ja—35006); Rambo 49570 (S), 49605 (N, S), 60070 (S); Reitz 2170 (N), 5412 (N), C.1215 (N); Reitz & Klein 5150a (W—2252077), 5171 (Ok, W—2268964), 5226 (Ok, W—2268984), 5342 (W—2252081), 7691 [Herb. Barb. Rodr. 22666] (Mm, N, S), 7745 (Mm), 8018 (Mm); Smith & Klein 7942 (Ok), 10508 (N, Ok, W—2251688); Smith, Reitz, & Klein 7942 (W—2251328). São Paulo: Bailey & Bailey 861 (Ba, Ba); Campos Porto 2982, in part [Herb. Jard. Bot. Rio Jan. 32604] (N), 2984 [Herb. Jard. Bot. Rio Jan. 32606] (B, N); Frazão s.n. [Herb. Jard. Bot. Rio Jan. 16528] (N); Hammar s.n. [Horto Botânico, Serra da Cantareira, Sept. 30, 1901; Herb. Comm. Geogr. & Geol. 5848] (N, Sp—15717); C. A. Krug s.n. [Herb. Inst. Agron. Est. S. Paulo 3994] (N, W—1775604); M. Kuhlmann s.n. [Umuarama, Jan. 26, 1935] (K, Sp—32387, Sp); Leite 3428 (El), 1v (N); Löfgren s.n. [São Francisco dos Campos, Dec. 21, 1896; Herb. Comm. Geogr. & Geol. 3496] (N, Sp—15726), s.n. [Altotieté, Oct. 19, 1901; Herb. Comm. Geogr. & Geol. 5847] (N, Sp—15712); Tamandaré & Brade s.n. [Serra da Cantareira, Jan. 11, 1914; Herb. Brade 6691] (N, Sp—6722); Usteri s.n. [Cantareira, Sept. 24, 1905] (Sp—15731); Viégas, Franco, & Lima s.n. [Ubatuba, March 9, 1940; Herb. Inst. Agron. Est. S. Paulo 5422] (N, Sp—44299). State undetermined: Sellow s.n. [Brasilia; Macbride photos 34348] (Br, Kr—photo, N—photo).

URUGUAY: Herter 50885 (N). ARGENTINA: Misiones: Niederlein s.n. (Ra--23600). Salta: D. Rodriguez 55 [Herb. Inst. Miguel Lillo 31564] (N). MOUNTED ILLUSTRATIONS: Pohl, Icon. Plant. Brasil. 329 (V).

VERBENA LOBATA var. GLABRATA Moldenke, Phytologia 3: 118. 1949.

Bibliography: Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 94 & 198. 1949; Moldenke, Phytologia 3: 118 & 134 (1949), 3: 289 (1950), and 3: 454. 1951; Moldenke, Résumé 110, 119, & 472. 1959.

This variety differs from the typical form of the species in being completely glabrous throughout.

The type of the variety was collected by Padre Balduino Rambo (no. 2816) at São Francisco de Paulo, Rio Grande do Sul, Brazil, on January 14, 1937, and is deposited in the Britton Herbarium at the New York Botanical Garden. The plant is said to inhabit thickets, stream margins, and river banks, flowering from December to February. In all, 4 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: BRAZIL: Rio de Janeiro: Ule 641 (Ja--46527). Rio Grande do Sul: Rambo 2816 (F—photo of type, N—type, N—photo of type, Rb—isotype, Sg—photo of type, Z—photo of type). URUGUAY: Arechavaleta 28 (Ug).

VERBENA LOBATA var. HIRSUTA Moldenke, Phytologia 2: 423—424. 1948.

Bibliography: Moldenke, Phytologia 2: 423—424. 1948; Moldenke, Castanea 13: 117. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 94 & 198. 1949; Moldenke, Alph. List Cit. 3: 704 & 847. 1949; Reitz, Sellowia 11: 57 & 134. 1959; Moldenke, Résumé 110 & 472. 1959; Moldenke, Résumé Suppl. 3: 14. 1962.

This variety differs from the typical form of the species in having the branches, branchlets, and twigs, as well as the petioles, lower leaf-surfaces, peduncles, bractlets, and calyxes very densely hirsute with widely spreading white or flavescens hairs. The upper leaf-surface is also more hirsute than in the typical form.

The type of the variety was collected by Gustaf Oskar Andersson Malme (no. 1260) in the grassy edges of a marsh at Pinhal, near Santa Maria, Rio Grande do Sul, Brazil, on January 27, 1902, and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm. The plant is described by collectors as sub-prostrate, with blue or violet corollas. It has been found in fields and thickets, hedgerows and dry grassy places, at the edges of rivers, and on campos, from 800 to 900 meters altitude, flowering from November to February. Reitz records the vernacular names "camaradinha", "formosa sem dote", and "jurupeba" for this and all other members of the genus in that area. Herbarium material has been misidentified and distributed as V. megapotamica Spreng.

In all, 26 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: BRAZIL: Minas Gerais: A. Lutz 393 (Lz); Regnall III.1619 [28/12/1868] (N, S, S). Rio Grande do Sul: Malme 1260 (F—photo of type, N—isotype, N—photo of type, S—type, Si—photo of type, Z—photo of type); Rambo 32302 (N), 38424 (N), 51405 (S), 51462 (S), 51505 (S), 51912 (S), 51949 (N, N, S, W—2102255), 53791 (S); Sehnem 3497 (N), 3776 (B). Santa Catarina: Reitz & Klein 5186 (N, Ok, W—2268971); Smith & Klein 8105 (W—2251345); Smith & Reitz 8105 (Z). PARAGUAY: Fiebrig 5884 (Bm, W—1159390).

VERBENA LOBATA var. SESSILIS Moldenke, Phytologia 4: 267 & 293. 1953.

Bibliography: Moldenke, Phytologia 4: 267 & 293. 1953; Moldenke, Biol. Abstr. 27: 3121. 1953; Angely, Fl. Paran. 7: 13. 1957; Moldenke, Résumé 110 & 472. 1959; Angely, Fl. Paran. 16: 78 (1960) and 17: 46. 1961; Moldenke, Phytologia 9: 289. 1963.

This variety differs from the typical form of the species in having its leaves sessile, the blades 1—2 cm. long and 5—13 mm. wide. The corolla is described as purple.

The type of the variety was collected by Gert Hatschbach (no. 2876) at Varzea, São José dos Pinhaes, Paraná, Brazil, on December 2, 1952, and is deposited in the Britton Herbarium at the New York Botanical Garden. The plant has been found in bogs and pastures, on campos, and in ruderal situations, at altitudes of 750 to 1650 meters, flowering in December and January. Smith & Reitz 8916 is a mixture with V. hirta Spreng.

In all, 6 herbarium specimens, including the type, have been examined by me.

Citations: BRAZIL: Paraná: Hatschbach 2876 (N—type). Santa Catarina: Smith & Reitz 8696 (W—2249356), 8916 (W—2251466, Z), 10341 (Ok, W—2251672).

VERBENA LONGIFOLIA Mart. & Gal., Bull. Acad. Brux. 11 (2): 323. 1844 [not V. longifolia Lam., 1873].

Synonymy: Verbena carolina var. glabra Hultén ex Moldenke, Résumé 361, in syn. 1959.

Bibliography: Mart. & Gal., Bull. Acad. Brux. 11 (2): 323. 1844; Schau. in A. DC., Prodr. 11: 555. 1847; Walp., Repert. Bot. Syst. 6: 687. 1847; Hook. f. & Jacks., Ind. Kew. 2: 1179. 1895; Ed. Rodigas, Bull. Arboricult. Belg. 1902: 114. 1902; Perry, Ann. Mo. Bot. Gard. 20: 247, 259, 271, 272, & 355. 1933; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 19 & 101. 1942; Moldenke, Phytologia 2: 331. 1947; Moldenke, Alph. List Cit. 3: 919 (1949) and 4: 1161, 1295, & 1303. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 33 & 198. 1949; Moldenke, Inform. Mold. Set 51 Spec. 4. 1956; Moldenke, Résumé 39, 361, & 472. 1959; Moldenke, Résumé Suppl. 3: 10. 1962; Moldenke, Phytologia 8: 427 (1962) and

8: 487, 488, & 492. 1963; Moldenke, Résumé Suppl. 6: 4. 1963.

Stems erect, to 1.5 m. tall, obtusely 4-angled, glabrous; branches many, ascending; leaves decussate-opposite, short-petiolate; leaf-blades lanceolate to elongate-elliptic, 10-12.5 cm. long or the upper ones somewhat smaller, acutely serrate from below the middle to the apex, appressed-pubescent or very short-strigillose on both surfaces, the venation prominent beneath; spikes paniculately disposed, slender, elongate, glabrous, open when in fruit; bractlets ovate, about half as long as the calyx, acute to acuminate at the apex, ciliate along the margins; calyx about 2 mm. long, practically glabrous; corolla pale-lavender or lilac, its tube scarcely protruding beyond the calyx, the limb inconspicuous; fruiting-calyx with its obtuse lobes connivent over the schizocarp; cocci trigonous, hardly 1.5 mm. long, smooth or faintly striate, the commissural faces smooth.

The type of this species was collected by Henri Guillaume Galeotti (no. 791) in fields at Ario, Michoacán, Mexico, at an altitude of 4000 feet, and is deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels. The type of V. carolina var. glabra was gathered by Harald August Fröderström and Elsa Hultén (no. 82) at an altitude of 1700 meters in Morelos, Mexico, and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm.

The species inhabits roadsides, brush, semixeric areas, low and low spiny matorral, the edges of arroyos, dry spots in general, and heavy red clay loam on steep slopes and hillsides in moist pine or fir forests, at altitudes of 700 to 2050 meters, and has been collected in flower and fruit in January, March, April, and August to November. McVaugh refers to it as an "abundant herb". Seler & Seler 4194 has galled spikes.

Herbarium material of this species has been misidentified and distributed under the names V. littoralis Kunth, V. littoralis H. B.K., and V. littoralis var. b. leptostachya Schau. The Gonzalez Ortega 60 & 226 collections, cited below, are labeled "Elota, La Cruz, El Roble" and apparently could have come from either Nayarit or Sinaloa. Seler & Seler 4194 was originally distributed as "Verbena caroliniana L. form. vel var. polystachya (Kunth) Loes." and 4347 as "Verbena spec. aff. V. caroliniana L.", while of C. R. Orcutt 1371 Perry says "Aff. V. menthaefolia Bth."

Martens & Galeotti (1844) affirm that the species is related to V. paniculata Lam. [=V. hastata L.], while Schauer (1847) points out that its leaves are similar to those seen on Veronica longifolia L. (Scrophulariaceae), with the inflorescence of Verbena urticifolia L. Perry (1933) describes it as "A rather singular species combining the foliar characters of V. littoralis with the inflorescence characters of V. carolina." She also says that Nelson 752, which she considers to be V. carolina L., "is almost glabrous, and the lobes of the corolla are emarginate, a

rather unusual feature in this series. The lack of pubescence suggests V. longifolia, but unfortunately none of the available material of the species is in sufficiently good condition to reveal the character of the corolla." She cites the following 9 additional specimens not as yet seen by me: MEXICO: Morelos: Seler & Seler 4194 (G), 4347 (G). Oaxaca: C. R. Orcutt 3321 (E). Puebla: Purpus 3406 (E, F, G, N). Vera Cruz: Seler & Seler 724 (G). See under V. carolina in these notes for her key for distinguishing this species from its nearest relatives. The V. longifolia Lam. referred to in the synonymy above, is a synonym of V. canadensis (L.) Britton.

In all, 27 herbarium specimens, including the type collections of both names involved, and 4 mounted photographs have been examined by me.

Citations: MEXICO: Coahuila: Aguirre & Reko 132 (N). México: Matuda 30538 (Se), 31307 (Ss). Michoacán: Galeotti 791 (Br—type, F—photo of type, N—photo of type, Si—photo of type, Z—photo of type). Jalisco: R. McVaugh 13077 (Mi), 14061 (Mi), 16174 (Mi). Morelos: Fröderström & Hultén 82 (S), 428 (S); Moldenke & Moldenke 19827 (Es, Lg, N); Pipes 113 (Z); J. H. Hill 44 (Mi); Seler & Seler 4194 (W—1205687), 4347 (W—1205719). Nayarit: J. Gonzalez Ortega 60 (Me), 226 (Me). Oaxaca: C. R. Orcutt 3321 (W—567342). Puebla: Purpus 3406 (N, W—841139). Sinaloa: J. Gonzalez Ortega 5478 (Me). Sonora: C. R. Orcutt 1371 (W—1168064). Vera Cruz: Liebmann 11318 (W—1315092); Seler & Seler 724 (Me, Me, W—1323102).

#### VERBENA LONGIFOLIA f. ALBIFLORA Moldenke, Phytologia 7: 430. 1961.

Bibliography: Moldenke, Phytologia 7: 430. 1961; Moldenke, Résumé Suppl. 3: 10. 1962.

This form differs from the typical form of the species in having white corollas.

The type of the form was collected by Boone Hallberg (no. 813) on moist clay banks of a drainage area from cleared cornfield among Persea cloudforests, on the east slopes near Patio de Arena, about 5 km. east of the summit, at about 2900 meters altitude, in the vicinity of Cerro Zampoaltepetl, Oaxaca, Mexico, on August 7, 1950, and is deposited in the herbarium of the University of Michigan at Ann Arbor. The plant is described as a perennial. It is known thus far only from the type specimen.

Citations: MEXICO: Oaxaca: B. Hallberg 813 (Mi—type).

#### VERBENA LUCANENSIS Moldenke, Phytologia 3: 279—280. 1950.

Bibliography: Moldenke, Phytologia 3: 279—280 & 286. 1950; E. J. Salisb., Ind. Kew. Suppl. 11: 263. 1953; Moldenke, Inform. Mold. Set 51 Spec. 4. 1956; Moldenke, Résumé 85 & 472. 1959.

Herb, 30—50 cm. tall; stems and branches erect or ascending, slender, rather obtusely tetragonal, densely short-pubescent with

whitish spreading hairs; nodes not annulate; principal internodes 0.5—4.2 cm. long; leaves decussate-opposite, usually with a dense cluster of small ones on abbreviated twigs in their axils; petioles obsolete; leaf-blades chartaceous, rather uniformly bright-green on both surfaces, the immature ones more or less brunescent in drying, ovate in outline, 1—4 cm. long and wide, deeply 3-parted, the divisions again deeply and rather irregularly parted or dissected, the lamina-segments 0.5—2.5 mm. wide, rather densely puberulent on both surfaces, obtuse or acute at the apex, subrevolute along the margins, the single vein in each segment impressed above, prominulous beneath; inflorescence terminal and in the upper leaf-axils, short-spicate or subcapitate, to 3.5 cm. long, densely many-flowered; peduncles very slender, 4—15 mm. long, densely spreading-pubescent like the branches; bractlets lanceolate, about 3 mm. long and 1 mm. wide, gradually attenuate to the apex, densely puberulent; calyx tubular, 3—4 mm. long, densely puberulent, its rim 5-toothed, the teeth narrow-attenuate; corolla hypocrateriform, varying from blue to violet or purple, its tube 6—7 mm. long, very lightly puberulous on the outside toward the apex, its limb about 6 mm. in diameter; fruiting-calyx not inflated, easily splitting into 5 similar segments; cocci 4, oblong, about 2 mm. long, glabrous, shiny, the dorsal surface uniformly scrobiculate-ridged, the commissural surface white-papillose for the lower two-thirds only.

The type of this distinct species was collected by Ramón Ferreyra (no. 5493) in stony habitats, at 1500 to 2000 meters altitude, between Nazca and Puquio, province of Lucanas, Ayacucho, Peru, on March 19, 1949, and is deposited in the Britton Herbarium at the New York Botanical Garden. The species has been found in the Baccharis and Loxopterygium zones, at altitudes of 2000 to 3600 meters, blooming in March, May, and August.

In all, 6 herbarium specimens, including the type, have been examined by me.

Citations: PERU: Ayacucho: R. Ferreyra 5493 (N--type, Ug--isotype); Rauh & Hirsch P.407 (Hk). Cajamarca: R. Ferreyra 8482 (Ss). Huancavelica: Rauh & Hirsch P.383 (Z). La Libertad: R. Ferreyra 3028 (Ss).

VERBENA MACDOUGALII Heller, Bull. Torrey Bot. Club 26: 588. 1899.

Synonymy: Verbena macdougali Heller ex Moldenke, Suppl. List Invalid Names 9, in syn. 1941. Verbena mcdougallii Heller ex Moldenke, Suppl. List Invalid Names 9, in syn. 1941. Verbena mcdougalii Heller ex Moldenke, Résumé 369, in syn. 1959. Verbena macdougali x hastata Lee ex Moldenke, Résumé Suppl. 3: 40, in syn. 1962. Verbena macdougalii Wooton ex Moldenke, Résumé Suppl. 3: 40, in syn. 1962. Verbena macdougallii Heller ex Moldenke, Résumé Suppl. 3: 40, in syn. 1962. Verbena macdougali Wooton ex Moldenke, Résumé Suppl. 6: 11, in syn. 1963.

Bibliography: Heller, Bull. Torrey Bot. Club 26: 588. 1899; Cockerell, Am. Nat. 36: 809. 1902; Thiselt.-Dyer, Ind. Kew. Suppl.

2: 191. 1904; Tidestr., Contrib. U. S. Nat. Herb. 25: 469. 1925; A. B. Seymour, Host Ind. Fungi N. Am. 587. 1929; Perry, Ann. Mo. Bot. Gard. 20: 260, 288—290, & 355. 1933; Moldenke, Prelim. Alph. List Invalid Names 47. 1940; Moldenke, Suppl. List Invalid Names 9. 1941; Wyman & Harris, Navajo Ind. Ethno-Bot. 32 & 45. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 10, 11, 13, 14, 74, & 101. 1942; Moldenke, Alph. List Invalid Names 48. 1942; Moldenke in Lundell, Fl. Texas 3 (1): 16 & 26. 1942; Moldenke, Am. Journ. Bot. 32: 610. 1945; G. L. Fisher, Am. Bot. Exchange List. 1946; Moldenke, Alph. List Cit. 1: 14, 24, 102, 126, 182, 191, 203, 245, 246, 255, 256, 258, 265, 281, & 283. 1946; Curtin, Healing Herbs Upper Rio Grande 75 & 272. 1947; Moldenke, Alph. List Cit. 2: 392, 393, 438, 452, 454, 455, 468, 471, 472, 474, 476, 477, 480, 482, 488, 489, 491, 492, 506, 519, 521, 532, 538, 539, 595, 597, 604, 618, & 640. 1948; Moldenke, Phytologia 2: 163. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 71. 1948; Moldenke, Wrightia 1: 225. 1948; Moldenke, Castanea 13: 112 & 113. 1948; Moldenke, Alph. List Cit. 3: 684, 697, 740, 747, 754, 779, 782, 831, 833, 839, 841, 853, 857, 883, 884, 890, 899, 904, 914, 952, & 966 (1949) and 4: 987, 1086, 1122, 1138, 1141, 1142, 1150, 1163, 1165, 1167, 1173—1175, 1207, 1225, 1228—1230, 1237, 1245, 1246, 1252, 1253, & 1289—1291. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 19, 20, 24—26, 164, & 198. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 14. 1949; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2209 & 2211. 1951; Moldenke, Résumé 24, 25, 29, 31, 32, 223, 369, & 472. 1959; Lewis & Oliv., Am. Journ. Bot. 48: 639—641. 1961; Moldenke, Résumé Suppl. 3: 8 & 40. 1962; Moldenke, Phytologia 8: 124 (1961) and 8: 213 & 435. 1962; Moldenke, Résumé Suppl. 5: 3, 4, & 7 (1962), 6: 11 (1963), and 7: 3. 1963; Moldenke, Phytologia 8: 487 (1963) and 9: 144. 1963.

Illustrations: Lewis & Oliv., Am. Journ. Bot. 48: 640. 1961.

Coarse perennial herb; stems stout, 0.3—1 m. tall, obtusely 4-angled, simple or occasionally branched, cinereous-green, whitish-hirsute or hirsute-pubescent; leaves decussate-opposite, short-petiolate or narrowed into a subpetiolar base, the blades oblong-elliptic or elongate-ovate, 6—10 cm. long, coarsely and irregularly serrate-dentate, hirtellous, rugose and minutely pustulate above, densely pilose-pubescent and prominently veined beneath; spikes solitary or sometimes several, short-pedunculate, thick, comparatively dense both during anthesis and in fruit; bractlets lanceolate-subulate, usually noticeably longer than the calyx, pubescent on the back, ciliate along the margins; calyx 4—5 mm. long, rather densely pubescent on the outside, glandular, its lobes very obtuse, terminating in short subulate teeth; corolla varying from purple or pink-purple to dark-purple or deep-purple, the throat white and hairy, its tube about 5 mm. long, scarcely protruding beyond the calyx, the limb 3.5—6 mm. wide; cocci trigonous, about 2.5 mm. long, convex on the dorsal surface, raised-reticulate toward the distal end, strongly or faintly striate below, the commissural face reaching the tip of

the coccus, muriculate or almost smooth; chromosome number:  $n = 7$ .

The type of this distinctive and handsome species was collected by Daniel Trembley MacDougal (no. 249) — in whose honor it is named — in the vicinity of Flagstaff, Coconino County, Arizona, on July 8, 1888, and is deposited in the Britton Herbarium at the New York Botanical Garden.

The species found on flats and open flats at high altitudes, as well as on dry slopes, lake shores, and prairies, along roadsides and weedy roadsides, in moist low places and open pinelands, in irrigated cultivated fields, in sandy and clayey soil, along drying streams, in open and dry open woods, in yellow pine forests and canyons, on river floodplains, and in volcanic soil, at altitudes of 2000 to 3165 meters, blooming and fruiting from June to October. It was introduced into cultivation in 1927. The specific name is often variously upper-cased.

Hanson found the plant "frequent in open places" and "in open pines", and Parker says "abundant on barren disturbed area around dump pile", but Schallert reports it as "not common". Waterfall describes it from "wet flat spots" and "pine woods in the mountains" in New Mexico, Weber calls it a "common roadside plant" in Colorado, and Demaree reports it "common" in rocky areas and "common in shade of pines" in Arizona. Goddard calls it a plant of the Upper Transition Zone.

This species is often infected by the fungus Erysiphe cichoracearum DC. and Ophiobolus collapsus Sacc. & Ellis. Common and vernacular names recorded for it are "dormilon", "dormilón", "New Mexican vervain", "sleepy-head", "verbena", "vervena", and the Navajo name "tádídí.n do. λ'is ncá.gí". Renner says of it "common, wide distribution, no uses, poor forage value, grazed from June to October".

Herbarium material has been misidentified and distributed under the names V. bracteosa Michx., V. canescens neo-mexicana Gray, V. canescens neomexicana Gray, V. canescens var. neo-mexicana Gray, V. polystachya H.B.K., V. stricta Vent., and "V. stricta var." On the other hand, the G. Martin s.n. [April 12, 1960], distributed as V. macdougalii, is actually xV. perplexa Moldenke. Benson 9573 is a mixture with V. bipinnatifida Nutt. Riordan 1 and H. E. Lee s.n. [9-19-36] have short bractlets; the latter collection was identified by the collector as a hybrid between this species and V. hastata L., which is a possibility because both species occur in the county where it was found and members of this group are noted for their natural proclivity toward hybridization.

Baldwin states of the flowers of V. macdougalii that the corolla is mostly a delicate purple, but the throat is white and hairy. Wooton s.n. [Mts. west of Grant's Station, Aug. 2, 1892] bears a note by the collector "Near Verbena stricta but differing from that plant in the size and shape of leaves, length of internodes, &c. Dr. Rusby has also collected this plant in Arizona".